3D Nation Elevation Requirements and Benefits Study

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INTRODUCTION

The U.S. federal agencies involved in terrestrial, ocean and coastal mapping are gathering information to improve the availability and consistency of 3D elevation data for the United States and its territories. The National Oceanic and Atmospheric Administration (NOAA) and the U.S. Geological Survey (USGS) are sponsoring the study. The results of the study will help agencies develop and refine future program alternatives for better 3D elevation data to meet many federal, state, and other national business needs.

For purposes of this questionnaire, 3D elevation data refers to topographic data (precise three-dimensional measurements on land) and bathymetric data (precise three-dimensional measurements in the water). Questions will be asked about how elevation data relate to your specific Mission Critical Activities (activities that are indispensable for mission accomplishment and/or essential for effective/efficient operations in accomplishing the core mission of the organization). The questionnaire also explores where you need elevation data (geographic extent), the accuracy and update frequencies you require, and your assessment of how your organization would benefit from better elevation data.

The 3D Nation Study

We would like to thank you in advance for participating in the 3D Nation Elevation Requirements and Benefits Study. This questionnaire covers a wide range of business uses that depend on 3D elevation data to inform policy, regulation, scientific research, and management decisions. By learning more about your business uses (see FAQ #1) and associated benefits that would be realized from improved 3D elevation data, we will be able to prioritize and direct investments that will best serve user needs.

The questionnaire includes questions about the technical requirements for 3D elevation data as well as questions about the benefits of 3D elevation data to your organization. The technical requirements may best be answered by an elevation data user who has experience working with the data. The benefits questions may best be answered by a stakeholder or person who makes management or business decisions. If applicable, the questionnaire may be jointly completed by an elevation data user and stakeholder in order to capture both perspectives for a Mission Critical Activity.

We expect the findings to help characterize and value national business needs for 3D elevation data and associated technologies. This information will help NOAA, USGS, and other Federal agency programs better meet stakeholder needs and fulfill their mapping mandates (see FAQ #2). The data will inform the design of future programs that balance requirements, benefits, and costs of elevation data at a national scale.

The results will also help to unite terrestrial and coastal/ocean mapping efforts for a true 3D Nation, from the highest mountains to the deepest oceans, to ensure public access to an accurate, authoritative national elevation dataset.

Instructions

- Please answer the questions from the perspective of your organization, not yourself personally.
- The responses to the questions are in two formats – open-ended and structured response.
  - Please enter responses to the open-ended questions in the text box below the questions.
  - For the structured response questions, use the drop-down or check boxes to choose the best response(s) for your organization and data uses.
- We recommend that you first review two tutorials for background and context:
  - A list of frequently asked questions (FAQs) on 3D elevation data terms used throughout the questionnaire. Even if all the terms in the FAQs are familiar to you, reviewing this material will help ensure that all participants have the same definitions in mind when answering the questions.
  - Examples of benefits that an organization might gain from improved topographic and/or bathymetric information. These benefits are organized into three categories: (1) Operational, (2) Customer Service, and (3) Societal Benefits. The tutorial also demonstrates methods for estimating monetary benefits, as we do have a few questions on this, among other types of benefits.
- Although we do not expect you to take a great deal of time researching the response for each question, you may exit the questionnaire and return at a later time. If you complete a response for a Mission Critical Activity, you may also return to the survey and complete a new entry for a new Mission Critical Activity.
- Some hints and suggestions from our survey pre-testers include:
  - The survey instrument seems to work faster on Internet Explorer than Google Chrome.
  - There are points during the survey where loading may slow, but have patience, the page will load.
  - We do not recommend taking the survey on a mobile device.
  - Hitting the Enter key in a small text box will save the response but bring you back to the previous page; instead, provide input and then move to the next question (via Tab on your keyboard or by using your mouse) or hit the Save or Next button at the bottom of the page.
  - You may return to the survey at any time using the link provided to you when you save and exit to complete questions or add new Mission Critical Activities. Check your Spam folder if you request the system to email you the link but don't receive it.

Public reporting burden for this collection of information is estimated to average 3 hours or less per response, including the time for reviewing instructions, reading explanatory Frequently Asked Questions and supporting information that may help you to respond to the survey questions, and completing and reviewing the collection of information. You will have the option to exit the questionnaire and return to it at a later time. Please send comments regarding this burden estimate or suggestions for reducing this burden to Ashley Chappell at 3DNationStudy@usgs.gov, NOAA Office of Coast Survey, 1315 East-West Hwy, Silver Spring, MD, 20910.

Your response to this survey is voluntary. We will aggregate responses at the agency, state, and national levels. We will not distribute responses associated with you as an individual. We ask you for some basic organizational and contact information to help us interpret the results and, if needed, to contact you for clarification. Notwithstanding any other provisions of the law, no person is required to respond to, nor shall any person be subjected to, a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

Privacy Act Statement

Authority: The collection of this information is authorized under 5 U.S.C. § 301, Departmental regulations, which authorizes the operations of an executive agency, including the creation, custodianship, maintenance, and distribution of records.

Purpose: NOAA and USGS collect this information on the 3D Nation questionnaire so that we may contact participants for clarification, if needed.

Agency Routine Uses: NOAA and USGS will use this information to enable communication with those participating in the 3D Nation questionnaire. Disclosure of this information is permitted under the Privacy Act of 1974 (5 U.S.C. Section 552a) to be shared among NOAA and USGS staff for work-related purposes. Disclosure of this information is also subject to all of the published routine uses as identified in the Privacy Act System of Records Notice Commerce/NOAA-11, Contact Information for Members of the Public Requesting or Providing Information Related to NOAA's Mission.

Disclosure: Furnishing this information is voluntary; however, failure to provide accurate information may delay or prevent the individual from submitting and/or receiving information.

Privacy and Paperwork Reduction Act statements: 16 U.S.C. 1a7 authorized collection of this information. This information will be used by NOAA and USGS to better serve the public. We will not distribute responses associated with you as an individual. We ask you for some basic organizational and contact information to help us interpret the results and, if needed, to contact you for clarification. When analysis of the questionnaires is completed, all name and address files will be destroyed. Thus, the permanent data will be anonymous.

Click NEXT to begin the survey.

Part 1: A Little About You and Your Agency or Organization

Please tell us a little about yourself so that we can contact you for clarification, if needed, and so we can aggregate responses by Agency, program, State, organization, etc. See FAQ #3.

Question 1. Please enter your contact information.

Your first name.

Your last name.

***Your Agency, State, or organization.**

Your job title.

Your telephone number. Enter text as xxx-xxx-xxxx (ext.)

Your email address.

***Question 2. Which type of organization do you represent? Please select one of the following options.**

- Federal Agencies and Commissions
- State or U.S. Territorial government
- Tribal government
- Regional, County, City, or other local government
- Academic or Not-for-Profit
- Private or Commercial
- Association or Professional Organization
- Other (please describe):

***Question 2a. What is the name of the Federal Agency or Commission for which you are defining 3D elevation data/information requirements? Please select one from the list. If you do not see your Agency or Commission listed, please choose "Other" and enter your Agency name.**

- USDA: Agricultural Research Service (ARS)
- USDA: Animal and Plant Health Inspection Service (APHIS)
- USDA: Farm Service Agency (FSA)
- USDA: Foreign Agriculture Service (FAS)
- USDA: Natural Resources Conservation Service (NRCS)
- USDA: U.S. Forest Service (USFS)
- DOC: Economic Development Administration
- DOC: National Institute of Standards and Technology (NIST)
- DOC: National Oceanic and Atmospheric Administration (NOAA)
- DOC: National Telecommunications and Information Administration (NTIA)
- DOC: U.S. Census Bureau (USCB)
- DOD: Defense Installations Spatial Data Infrastructure (DISDI)
- DOD: Defense Threat Reduction Agency (DTRA)
- DOD: Department of the Air Force
- DOD: Department of the Army
- DOD: Department of the Navy
- DOD: National Geospatial-Intelligence Agency (NGA)
- DOD: U.S. Army Corps of Engineers (USACE)
- DOD: U.S. Marine Corps
- DOE: Bonneville Power Administration (BPA)
- DOE: Oak Ridge National Laboratory
- DOE: Office of Energy Efficiency and Renewable Energy (EERE)
- DOE: Southeastern Power Administration (SEPA)
- DOE: Southwestern Power Administration (SWPA)
- DOE: Western Area Power Administration (WAPA)
- HHS: Centers for Disease Control (CDC)
- DHS: Domestic Nuclear Detection Office (DNDO)
- DHS: Federal Emergency Management Agency (FEMA)
- DHS: National Protection and Programs Directorate (NPPD)
- DHS: Office of the Chief Information Officer (OCIO)
- DHS: Office of Intelligence and Analysis (OIA)
- DHS: Office of Operations Coordination (OOC)
- DHS: Science and Technology Directorate (S&T)
- DHS: Transportation Security Administration (TSA)
- DHS: U.S. Coast Guard (USCG)
- DHS: U.S. Customs and Border Protection (USCBP)
- DHS: U.S. Secret Service (USSS)
- Department of Housing and Urban Development (HUD)
- DOI: Bureau of Indian Affairs (BIA)

- DOI: Bureau of Land Management (BLM)
- DOI: Bureau of Ocean Energy Management (BOEM)
- DOI: Bureau of Reclamation
- DOI: Bureau of Safety and Environmental Enforcement (BSEE)
- DOI: National Park Service (NPS)
- DOI: Office of Surface Mining Reclamation and Enforcement (OSMRE)
- DOI: U.S. Fish and Wildlife Service (USFWS)
- DOI: U.S. Geological Survey (USGS)
- DOJ: Federal Bureau of Investigation (FBI)
- Department of Labor (DOL)
- Department of State (DOS)
- DOT: Federal Aviation Administration (FAA)
- DOT: Federal Highway Administration (FHWA)
- DOT: Federal Motor Carrier Safety Administration (FMCSA)
- DOT: Federal Railway Administration (FRA)
- DOT: Maritime Administration (MARAD)
- DOT: Office of the Assistant Secretary for Research and Technology (OST-R)
- DOT: Pipeline and Hazardous Materials Safety Administration (PHMSA)
- Department of the Treasury
- Environmental Protection Agency (EPA)
- Federal Communications Commission (FCC)
- Federal Energy Regulatory Commission (FERC)
- Great Lakes Commission (GLC)
- International Boundary and Water Commission (IBWC)
- International Joint Commission (IJC)
- Marine Mammal Commission (MMC)
- National Aeronautics and Space Administration (NASA)
- National Science Foundation (NSF)
- Nuclear Regulatory Commission (NRC)
- Tennessee Valley Authority (TVA)
- U.S. Agency for International Development (USAID)
- U.S. Arctic Research Commission
- U.S. Committee on the Marine Transportation System (CMTS)
- Other Federal Agency or Commission (please specify):

***Question 2b. What is the name of the sub-agency, division, department, and/or branch for which your requirements pertain? Please enter text.**

***Question 2c. What is the name of your State, Territory, or Washington, D.C.? Please select one.**

- Alabama
- Alaska
- American Samoa
- Arizona
- Arkansas
- California
- Colorado
- Connecticut
- Delaware
- Federated States of Micronesia
- Florida
- Georgia
- Guam
- Hawai'i

- Idaho
- Illinois
- Indiana
- Iowa
- Kansas
- Kentucky
- Louisiana
- Maine
- Marshall Islands
- Maryland
- Massachusetts
- Michigan
- Minnesota
- Mississippi
- Missouri
- Montana
- Nebraska
- Nevada
- New Hampshire
- New Jersey
- New Mexico
- New York
- North Carolina
- North Dakota
- Northern Mariana Islands
- Ohio
- Oklahoma
- Oregon
- Palau
- Pennsylvania
- Puerto Rico
- Rhode Island
- South Carolina
- South Dakota
- Tennessee
- Texas
- U.S. Minor Outlying Islands
- U.S. Virgin Islands
- Utah
- Vermont
- Virginia
- Washington
- Washington, D.C.
- West Virginia
- Wisconsin
- Wyoming

***Question 2d. What is the name of your Tribal government? Please enter text.**

***Question 2e. What is the name of your regional, county, city, or other local government agency? Please enter text.**

***Question 2f. What is the name of your academic or not-for-profit organization? Please enter text.**

*Question 2g. What is the name of your private or commercial organization? Please enter text.

*Question 2h. What is the name of your association or professional organization? Please enter text.

*Question 3. What is the mission of your Agency or organization? Please enter text.

Part 2: Mission Critical Activity, Business Use, and Program Name

In part 2 of the questionnaire, we would like to learn about your Mission Critical Activities that support your Business Uses, which require 3D elevation data and related information products. Your first iteration through this questionnaire refers to your **primary** Mission Critical Activity. You may submit additional responses for additional Mission Critical Activities by using the same survey link provided to you and repeating the questionnaire.

Mission Critical Activity– Mission Critical is defined herein as "indispensable for mission accomplishment and/or essential for effective/efficient operations in accomplishing the core mission of the organization." Examples might include such activities as oil and gas exploration, dam break modeling and inundation mapping, marine navigation, or precision farming.

Business Use– The ultimate use of services or products from Mission Critical Activities to accomplish an organized mission. Example: BU13 – Oil and Gas Resources, BU15 – Flood Risk Management, BU 20 - Marine and Riverine Navigation and Safety, BU 08 - Agriculture and Precision Farming.

***Question 4. What is the name of your specified Mission Critical Activity? This question is about Mission Critical Activities that are performed by your organization. Using examples from below and/or the FAQs as a guide, describe the Mission Critical Activity in your own words. We prefer a higher level activity, e.g., coastal hazard mitigation, rather than a lower level activity, e.g., SLOSH modeling (used in coastal hazard mitigation). Please enter text. See FAQ #1.**

***Question 5a. What is your primary Business Use? You must select at least one Business Use from the list below. You may select up to 3 Business Uses that apply to your Mission Critical Activity, but your reported requirements and benefits will be aggregated with the primary Business Use you select.**

Examples of Mission Critical Activities that correlate with these Business Uses are provided below. Select at least one Business Use from the list below. If your Mission Critical Activity supports multiple Business Uses, you may designate up to 2 other Business Uses as secondary and tertiary. See FAQ #1.

Reminder: Once you have submitted all information related to your primary Mission Critical Activity, you may submit additional Mission Critical Activities.

Business Uses	Examples of Mission Critical Activities
BU 01 - Water Supply and Quality	Fate and transport of contaminants. Pollution risk mitigation. Runoff and sedimentation analyses. Point- or non-point source pollution modeling. Management of contaminants and marine debris - point, non-point, vessel, and atmospheric pollution; spills; trash.
BU 02 - Riverine Ecosystem Management	Stream channel analysis and mapping. Stream bank erosion analysis. Aquatic and terrestrial species habitat management. Environmental management.
BU 03 - Coastal Zone Management	Analysis of coastal erosion and inundation. Hurricane storm surge and wind damage modeling and assessment. Coastal hazard modeling and mapping. Coastal hazard mitigation. Tsunami modeling. Land use and environmental planning. Coastal resiliency. Oil spill modeling. Littoral zone management including dunes and beaches.
BU 04 - Forest Resources Management	Forest health assessment. Determination of standing inventory of forest resources. Prescribed burn planning. Analysis of carbon stocks for trade. Harvest systems planning.
BU 05 - Rangeland Management	Assessment of rangeland health. Mapping for soil erosion potential due to grazing.
BU 06 - Natural Resources Conservation	Conservation engineering. Soils and wetlands mapping and characterization. Modeling of biological and ecological systems. Erosion control. Rainfall penetration studies, impervious surfaces. Assessment of blue carbon stocks.
BU 07 - Wildlife and Habitat Management	Conservation planning for wildlife refuges and marine sanctuaries. Conservation of critical habitats. Management of diverse migratory bird habitats, coral reef and coral communities, marine mammals, protected fish species, and trust resources.
BU 08 - Agriculture and Precision Farming	Farm pond design. Irrigation system design. Detailed site analysis to support precision farming. Analysis of farm sedimentation and runoff. Calibration of fertilizer application, fertilizer management, and irrigation planning. Optimized terraforming.
BU 09 - Fisheries Management and Aquaculture	Management of fisheries. Sustainable aquaculture.
BU 10 - Geologic Assessment and Hazard Mitigation	Geologic mapping and analysis. Sinkhole and steephead mapping, monitoring, and analysis. Identification of geomorphologic units. Landslide hazard mapping and assessment. Karst mapping, including springs and caves. Aquifer recharge.

BU 11 - Geologic Resource Mining and Extraction	Onshore or offshore mineral extraction. Monitoring sand as a local resource. Seabed resources. Open mine volume computations. Stockpile analysis. Environmental impact assessment and site restoration.
BU 12 - Renewable Energy Resources	Alternate energy development – solar, tidal, wind, wave, and ocean current. Assessment of rooftops for solar energy potential. Analysis of wind energy potential and turbine placement. Low head power potential for hydropower.
BU 13 - Oil and Gas Resources	Oil and gas exploration and production. Pipeline and route selection. Facility siting to mitigate geologic hazards. Construction planning. Environmental impact assessment and mitigation. Regulatory compliance.
BU 14 - Cultural Resources Preservation and Management	Discovery and analysis of underwater archaeological and historical cultural sites. Site protection and preservation planning. Discovery and analysis of Native American and other historical cultural sites and subsistence activities.
BU 15 - Flood Risk Management	Flood risk modeling and mapping of riverine and coastal areas. Dam/dike/levee safety analysis. Emergency management. Flood forecasts.
BU 16 - Sea Level Rise and Subsidence	Modeling and mapping the effects of sea level rise or subsidence. Population and economic vulnerability assessments. Coastal inundation and infrastructure assessment.
BU 17 - Wildfire Management, Planning, and Response	Determination of forest fuel and fire susceptibility. Fire behavior modeling to support wildfire suppression activities. Wildland/urban interface building identification. Post-fire analysis to determine landslide-prone areas.
BU 18 - Homeland Security, Law Enforcement, Disaster Response, and Emergency Management	Infrastructure and border protection. Coastal search and rescue. Population dynamics. Emergency fuel supply and movement. Line-of-sight analysis in urban areas. Disaster response. Flood risk analysis resulting from acts of terrorism.
BU 19 - Land Navigation and Safety	Road and railroad route selection and maintenance. Slope analysis for autonomous cars. GPS navigation visualization.
BU 20 - Marine and Riverine Navigation and Safety	Nautical charting. Bathymetric measurements of near-shore submerged coastal topography. Identification of hazards to navigation. Sediment management at coastal navigation projects. Precision marine navigation. Movement of goods and fishing vessels.
BU 21 - Aviation Navigation and Safety	Determination of in-flight hazards and path obstructions. Aeronautical charting. Runway construction and repair.
BU 22 - Infrastructure and Construction Management	Marine construction. Bridge design and construction. Engineering and construction of dams, levees, dikes, reservoirs, and coastal structures. Shipyard and port construction. Water, sewer, or power line planning and vegetation analysis. Pump, drain, and well placement. Stormwater modeling. Cut and fill analysis for earth-moving. Building site analysis. Road infrastructure. Infrastructure hardening or mitigation for climate change effects, e.g. sea level change.
BU 23 - Urban and Regional Planning	Land development and zoning. Municipal mapping of building footprints and elevations. Port resilience planning. Parks and transportation planning. Virtual city creation. Urban ecology planning.
BU 24 - Health and Human Services	Health emergency response. Habitat modeling and disease prevention. Defining boundaries for health advisories for swimming and fishing. Marine-based bioproducts and pharmaceuticals. Public health and safety. Prevention of waterborne diseases.
BU 25 - Real Estate, Banking, Mortgage, and Insurance	Assessment of risk for natural hazards (e.g., sinkholes, flooding) to inform insurance policy rates and the determination of mandatory insurance. Building permit compliance.
BU 26 - Education K-12 and Beyond, Basic Research	Development of 3D visualizations to help students understand the Earth they live on. Understanding of continental-scale climate change impacts. Ocean science. Ocean education. Scientific research. Data dissemination. Development of training simulators.
BU 27 - Recreation	Planning and development of recreational facilities such as rafting, boating, swimming, diving, and fishing areas; ski slopes; and golf courses. Location-based products and services such as maps and guides. Tourism. Trail and vista site planning. Orienteering.
BU 28 - Telecommunications	Telecommunication tower site selection. Design of radio and radar systems. Interference analysis. Path profiles. Undersea telecommunication route selection and deployment.
BU 29 - Military	Tactical military operations. Strategic defense. Amphibious landings and logistics over-the-shore. Operation of ships and submarines. Weapons system testing. Management of flight facilities and offshore launch or target areas.
BU 30 - Maritime and Land Boundary Management	Delimitation of legal and other coastal boundaries, inland boundaries, and ordinary high water lines (OHWL).

- BU 01 - Water Supply and Quality
- BU 02 - Riverine Ecosystem Management
- BU 03 - Coastal Zone Management
- BU 04 - Forest Resources Management
- BU 05 - Rangeland Management
- BU 06 - Natural Resources Conservation

- BU 07 - Wildlife and Habitat Management
- BU 08 - Agriculture and Precision Farming
- BU 09 - Fisheries Management and Aquaculture
- BU 10 - Geologic Assessment and Hazard Mitigation
- BU 11 - Geologic Resource Mining and Extraction
- BU 12 - Renewable Energy Resources
- BU 13 - Oil and Gas Resources
- BU 14 - Cultural Resources Preservation and Management
- BU 15 - Flood Risk Management
- BU 16 - Sea Level Rise and Subsidence
- BU 17 - Wildfire Management
- BU 18 - Homeland Security
- BU 19 - Land Navigation and Safety
- BU 20 - Marine and Riverine Navigation and Safety
- BU 21 - Aviation Navigation and Safety
- BU 22 - Infrastructure and Construction Management
- BU 23 - Urban and Regional Planning
- BU 24 - Health and Human Services
- BU 25 - Real Estate
- BU 26 - Education K-12 and Beyond
- BU 27 - Recreation
- BU 28 - Telecommunications
- BU 29 - Military
- BU 30 - Maritime and Land Boundary Management

Question 5b. Do you have any additional Business Uses?

- Yes
- No

Question 5c. What is your secondary Business Use?

Examples of Mission Critical Activities that correlate with these Business Uses are provided in the table above. If your Mission Critical Activity supports multiple Business Uses, you can use the drop downs below to designate up to two additional Business Uses as secondary and tertiary. See FAQ #1.

- BU 01 - Water Supply and Quality
- BU 02 - Riverine Ecosystem Management
- BU 03 - Coastal Zone Management
- BU 04 - Forest Resources Management
- BU 05 - Rangeland Management
- BU 06 - Natural Resources Conservation
- BU 07 - Wildlife and Habitat Management
- BU 08 - Agriculture and Precision Farming
- BU 09 - Fisheries Management and Aquaculture
- BU 10 - Geologic Assessment and Hazard Mitigation
- BU 11 - Geologic Resource Mining and Extraction
- BU 12 - Renewable Energy Resources
- BU 13 - Oil and Gas Resources
- BU 14 - Cultural Resources Preservation and Management
- BU 15 - Flood Risk Management
- BU 16 - Sea Level Rise and Subsidence
- BU 17 - Wildfire Management
- BU 18 - Homeland Security
- BU 19 - Land Navigation and Safety
- BU 20 - Marine and Riverine Navigation and Safety

- BU 21 - Aviation Navigation and Safety
- BU 22 - Infrastructure and Construction Management
- BU 23 - Urban and Regional Planning
- BU 24 - Health and Human Services
- BU 25 - Real Estate
- BU 26 - Education K-12 and Beyond
- BU 27 - Recreation
- BU 28 - Telecommunications
- BU 29 - Military
- BU 30 - Maritime and Land Boundary Management

Question 5d. What is your tertiary Business Use?

Examples of Mission Critical Activities that correlate with these Business Uses are provided in the table above. If your Mission Critical Activity supports multiple Business Uses, you can use the drop downs below to designate up to two additional Business Uses as secondary and tertiary. See FAQ #1.

- BU 01 - Water Supply and Quality
- BU 02 - Riverine Ecosystem Management
- BU 03 - Coastal Zone Management
- BU 04 - Forest Resources Management
- BU 05 - Rangeland Management
- BU 06 - Natural Resources Conservation
- BU 07 - Wildlife and Habitat Management
- BU 08 - Agriculture and Precision Farming
- BU 09 - Fisheries Management and Aquaculture
- BU 10 - Geologic Assessment and Hazard Mitigation
- BU 11 - Geologic Resource Mining and Extraction
- BU 12 - Renewable Energy Resources
- BU 13 - Oil and Gas Resources
- BU 14 - Cultural Resources Preservation and Management
- BU 15 - Flood Risk Management
- BU 16 - Sea Level Rise and Subsidence
- BU 17 - Wildfire Management
- BU 18 - Homeland Security
- BU 19 - Land Navigation and Safety
- BU 20 - Marine and Riverine Navigation and Safety
- BU 21 - Aviation Navigation and Safety
- BU 22 - Infrastructure and Construction Management
- BU 23 - Urban and Regional Planning
- BU 24 - Health and Human Services
- BU 25 - Real Estate
- BU 26 - Education K-12 and Beyond
- BU 27 - Recreation
- BU 28 - Telecommunications
- BU 29 - Military
- BU 30 - Maritime and Land Boundary Management

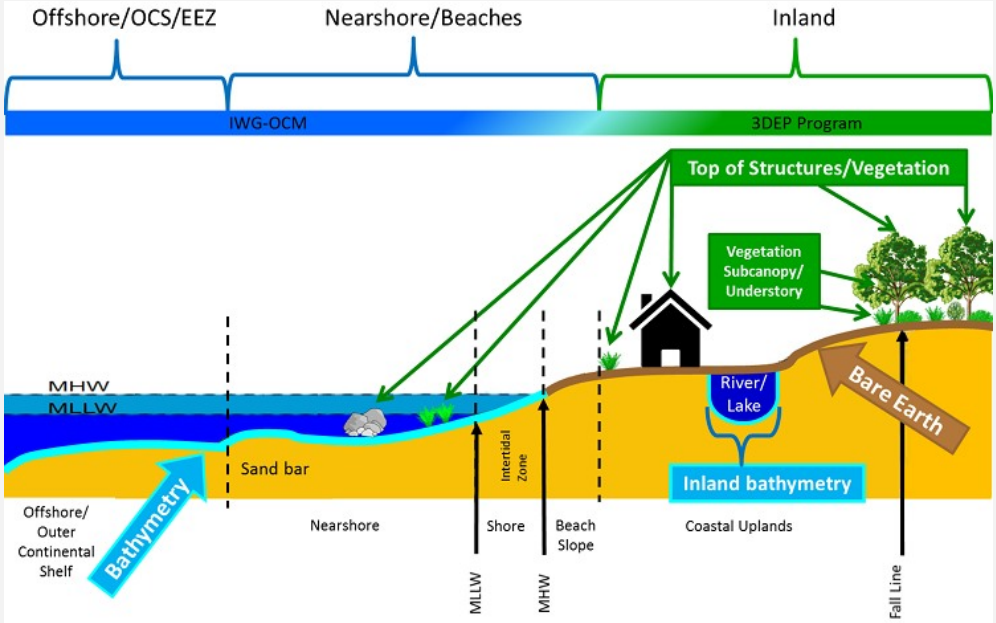
Question 6. What is the name of the program supported by your specified Mission Critical Activity? A program is a major component of your organization that has a well-defined mission and goals and which is supported by one or more Mission Critical Activities. Please enter text. See FAQ #1.

Question 6a. What is the total annual program budget supported by this Mission Critical Activity? Must be a US dollar amount (e.g., $500 or 1,000,000).

Part 3: 3D Elevation Data Requirements

In this section you will identify your mission critical requirements for 3D elevation data. Mission Critical is defined as "indispensable for mission accomplishment and/or essential for effective/efficient operations in accomplishing the core mission of the organization." Therefore, please do not specify a requirement that is "nice to have" (unless requested) but focus instead on what you must have to support your Mission Critical Activity. Please try to be forward looking in your answers so that we can anticipate future requirements to the extent possible.

***Question 7. For your Mission Critical Activity, how would you characterize the area for which you need 3D elevation data? Each selected choice will take you to a section of the questionnaire where you will be asked to specify a geographic area of interest and provide your requirements for and benefits of enhanced 3D elevation data. Check all that apply. See FAQ #4.**



- [ ] Inland land areas (i.e. inland topography) **Complete Part 3.1**
- [ ] Inland waters (i.e. inland bathymetry) **Complete Part 3.2**
- [ ] Nearshore/Beaches, including Great Lakes (i.e. topobathy and/or nearshore bathymetry) **Complete Part 3.3**
- [ ] Offshore/Outer Continental Shelf/Exclusive Economic Zone, including Great Lakes (i.e. bathymetry) **Complete Part 3.4**

Question 8. For the Mission Critical Activity that you specified, please describe the importance of what you need/want to measure in 3D. For each feature type, identify *how important* it is to your Mission Critical Activity to measure the feature in 3D. See FAQ #5.

Importance rating: Required; Highly desirable; Nice to have; Not required

	Required	Highly desirable	Nice to have	Not required
Feature Type				
Bare earth ground	○	○	○	○
Tops of buildings, structures, objects	○	○	○	○
Tops of vegetation	○	○	○	○
Tops of submerged structures, objects	○	○	○	○
Tops of submerged vegetation	○	○	○	○
Subcanopy of vegetation/understory	○	○	○	○
River/lake bottom	○	○	○	○
Nearshore elevation (<10 m deep)	○	○	○	○
Sea surface	○	○	○	○
Ocean/sea bottom (>10 m deep)	○	○	○	○
Other (please describe an	○	○	○	○

Question 9. For the Mission Critical Activity you specified, what is the average geographic extent of the area you work with on a day-to-day basis? Please select one.

- ○ Individual feature (e.g. single tree, single structure)
- ○ Less than 1 sq mi (e.g. plot, acre, small study area)
- ○ 1 sq mi - 49 sq mi (e.g. small city/town, Census Tract, Voting District, Zip Code, etc.)
- ○ 50 sq mi - 999 sq mi (e.g. small county or County Equivalent, District of Columbia, etc.)

- 1,000 sq mi - 24,999 sq mi (e.g. large county, small state, intrastate region [e.g. a multi-county region such as the San Francisco Bay Area, Tri-County Council, etc.])
- 25,000 sq mi - 74,999 sq mi (e.g. medium state or large multi-county region)
- 75,000 sq mi - 199,999 sq mi (e.g. large state or medium multi-state region)
- 200,000 sq mi - 2 million sq mi (e.g. large state, large multi-state region such as the Great Basin, standard Federal region, etc.)
- Larger than 2 million sq mi (e.g. National)
- Other (please describe):

Question 10a. What is the approximate size of the smallest 3D feature you are interested in? Please select one.

- Survey-level features (e.g. sign, curb, road line, mailbox, rock, etc.)
- Small features (e.g. individual shrub, tree, car, mooring anchor, small dock, etc.)
- Large features (e.g. groups of trees, house, building, road, underwater wreck, large commercial pier, etc.)
- Aggregated features (e.g. generalized landscapes, large areal patches of seagrass, coral reef, etc.)
- Other (please describe):

Question 10b. Please describe the smallest 3D features you are interested in:

Part 3.1 - Questions for Inland Topography Requirements

***Please be patient, this question can take up to 30 seconds to load.**

Question 11. In this section, please identify the geographic area requirements for the inland topography portion of your Mission Critical Activity described above. We need to understand geographic area requirements for each Mission Critical Activity. Questionnaire participants are encouraged to describe their geographic (area of coverage) requirements using the provided pick lists. Alternatively, a shapefile, KML, or geodatabase for your geographic Area(s) of Interest may be provided.

My geographic area requirements are:

- ○ Nationwide, inland areas
- ○ One or more states, territories, or counties
- ○ One or more Hydrologic Units
- ○ Federally-owned lands nationwide, all lands of U.S. Tribes, or select large land holding agencies
- ○ None of the above; I will provide my own shapefile, KML, or geodatabase

***Question 11a. If your geographic area requirements for inland topographic data for your Mission Critical Activity are nationwide, please check the items below that best represent your nationwide requirements.**

- ☐ 48 conterminous states
- ☐ Alaska
- ☐ Hawai'i
- ☐ American Samoa
- ☐ Guam
- ☐ Northern Mariana Islands
- ☐ Federated States of Micronesia
- ☐ Palau
- ☐ Marshall Islands
- ☐ U.S. Minor Outlying Islands (Baker Island, Howland Island, Jarvis Island, Johnston Island, Kingman Reef, Midway Islands, Navassa Island, Palmyra Atoll, and Wake Island)
- ☐ Puerto Rico
- ☐ U.S. Virgin Islands
- ☐ All of the above

***Question 11b. If your geographic area requirements for inland topographic data for your Mission Critical Activity are for one or more states or counties, please check the state(s) below that are required. After you select the state(s) you will be allowed to identify sub-regions (counties) where 3D elevation data are required.**

☐ Alabama	☐ Louisiana	☐ Oklahoma
☐ Alaska	☐ Maine	☐ Oregon
☐ American Samoa	☐ Maryland	☐ Palau
☐ Arizona	☐ Marshall Islands	☐ Pennsylvania
☐ Arkansas	☐ Massachusetts	☐ Puerto Rico
☐ California	☐ Michigan	☐ Rhode Island
☐ Colorado	☐ Minnesota	☐ South Carolina
☐ Connecticut	☐ Mississippi	☐ South Dakota
☐ Delaware	☐ Missouri	☐ Tennessee
☐ Federated States of Micronesia	☐ Montana	☐ Texas
☐ Florida	☐ Nebraska	☐ U.S. Minor Outlying Islands
☐ Georgia	☐ Nevada	☐ U.S. Virgin Islands
☐ Guam	☐ New Hampshire	☐ Utah
☐ Hawai'i	☐ New Jersey	☐ Vermont
☐ Idaho	☐ New Mexico	☐ Virginia
☐ Illinois	☐ New York	☐ Washington
☐ Indiana	☐ North Carolina	☐ Washington, D.C.
☐ Iowa	☐ North Dakota	☐ West Virginia
☐ Kansas	☐ Northern Mariana Islands	☐ Wisconsin

- [ ] Kentucky
- [ ] Ohio
- [ ] Wyoming

Please be patient, this question can take up to 30 seconds to load.

Question 11b1. Do you have any sub-regions (counties or cities) where inland topography information is required?

- ○ Yes
- ○ No

Question 11b2. Please list the sub-regions (counties or cities) where inland topography information is required. Enter sub-region (county or city) first and then state (example: Fairfax County, VA or Chicago, IL).

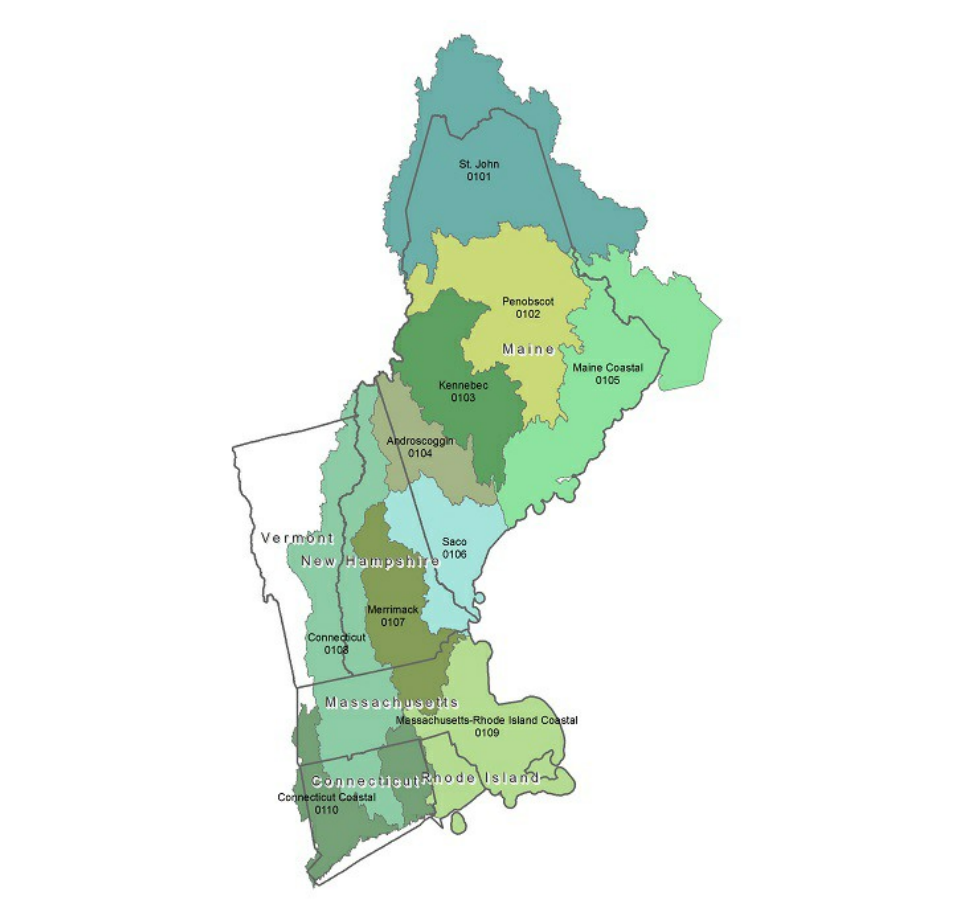
***Please be patient, this question can take up to 30 seconds to load.**

Question 11c. If your geographic area requirements for inland topography pertain to hydrologic units (HUs), please check the appropriate hydrologic region(s) (2-digit HU) below. This will lead you to select individual 4-digit HUs nested within your hydrologic region. Please select all that are required.

- [ ] 01 New England
- [ ] 02 Mid-Atlantic
- [ ] 03 South Atlantic-Gulf
- [ ] 04 Great Lakes
- [ ] 05 Ohio
- [ ] 06 Tennessee
- [ ] 07 Upper Mississippi
- [ ] 08 Lower Mississippi
- [ ] 09 Souris-Red-Rainy
- [ ] 10 Missouri
- [ ] 11 Arkansas-White-Red
- [ ] 12 Texas – Gulf
- [ ] 13 Rio Grande
- [ ] 14 Upper Colorado
- [ ] 15 Lower Colorado
- [ ] 16 Great Basin
- [ ] 17 Pacific Northwest
- [ ] 18 California
- [ ] 19 Alaska
- [ ] 20 Hawai'i
- [ ] 21 Caribbean
- [ ] 22 Pacific Islands

Question 11c1. 01 New England

Please select individual HUC-4 codes for your specific hydrologic units.

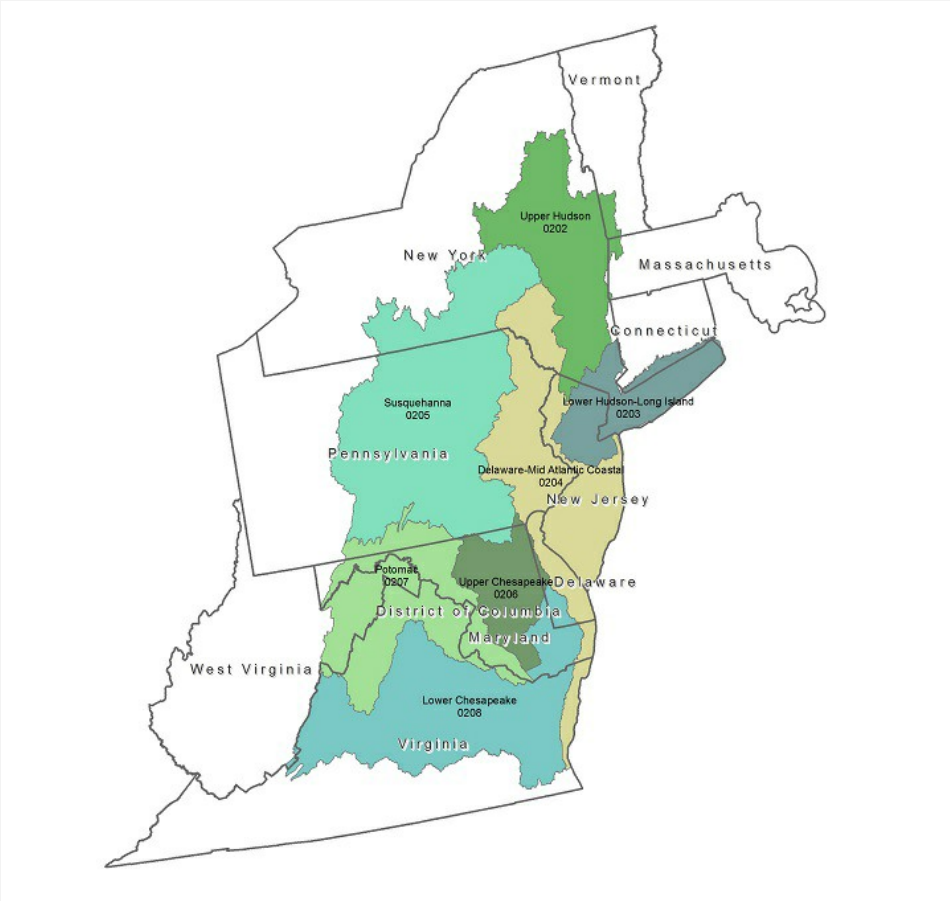


- [ ] 0101 - St. John
- [ ] 0102 - Penobscot
- [ ] 0107 - Merrimack
- [ ] 0108 - Connecticut

- [ ] 0103 - Kennebec
- [ ] 0104 - Androscoggin
- [ ] 0105 - Maine Coastal
- [ ] 0106 - Saco
- [ ] 0109 - Massachusetts-Rhode Island Coastal
- [ ] 0110 - Connecticut Coastal
- [ ] All codes

Question 11c2. 02 Mid-Atlantic

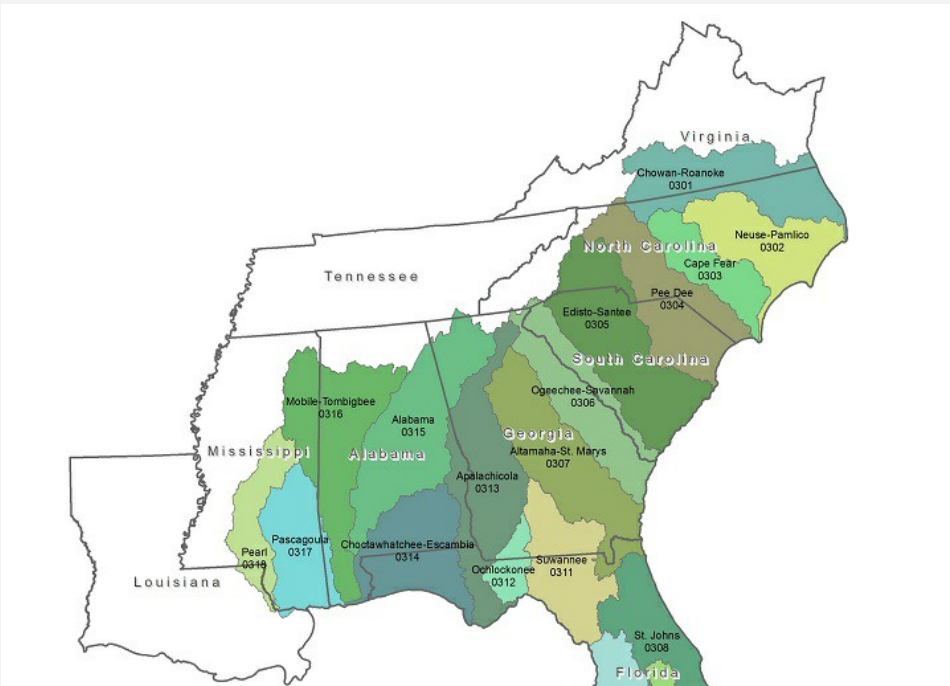
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0202 - Upper Hudson
- [ ] 0203 - Lower Hudson-Long Island
- [ ] 0204 - Delaware-Mid Atlantic Coastal
- [ ] 0205 - Susquehanna
- [ ] 0206 - Upper Chesapeake
- [ ] 0207 - Potomac
- [ ] 0208 - Lower Chesapeake
- [ ] All codes

Question 11c3. 03 South Atlantic-Gulf

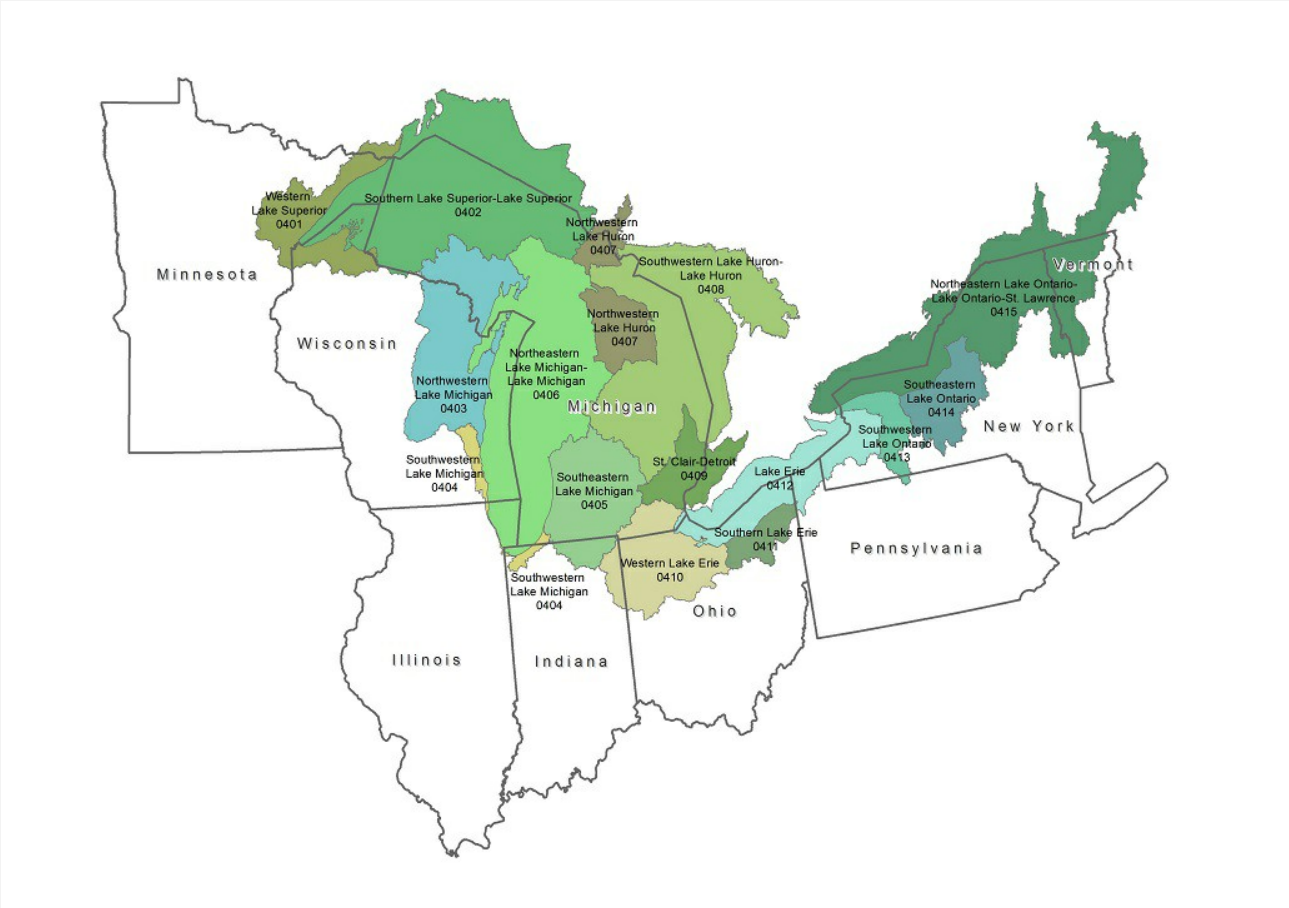
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0301 - Chowan-Roanoke
- [ ] 0302 - Neuse-Pamlico
- [ ] 0303 - Cape Fear
- [ ] 0304 - Pee Dee
- [ ] 0305 - Edisto-Santee
- [ ] 0306 - Ogeechee-Savannah
- [ ] 0307 - Altamaha-St. Marys
- [ ] 0308 - St. Johns
- [ ] 0309 - Southern Florida
- [ ] 0310 - Peace-Tampa Bay
- [ ] 0311 - Suwannee
- [ ] 0312 - Ochlockonee
- [ ] 0313 - Apalachicola
- [ ] 0314 - Choctawhatchee-Escambia
- [ ] 0315 - Alabama
- [ ] 0316 - Mobile-Tombigbee
- [ ] 0317 - Pascagoula
- [ ] 0318 - Pearl
- [ ] All codes

Question 11c4. 04 Great Lakes

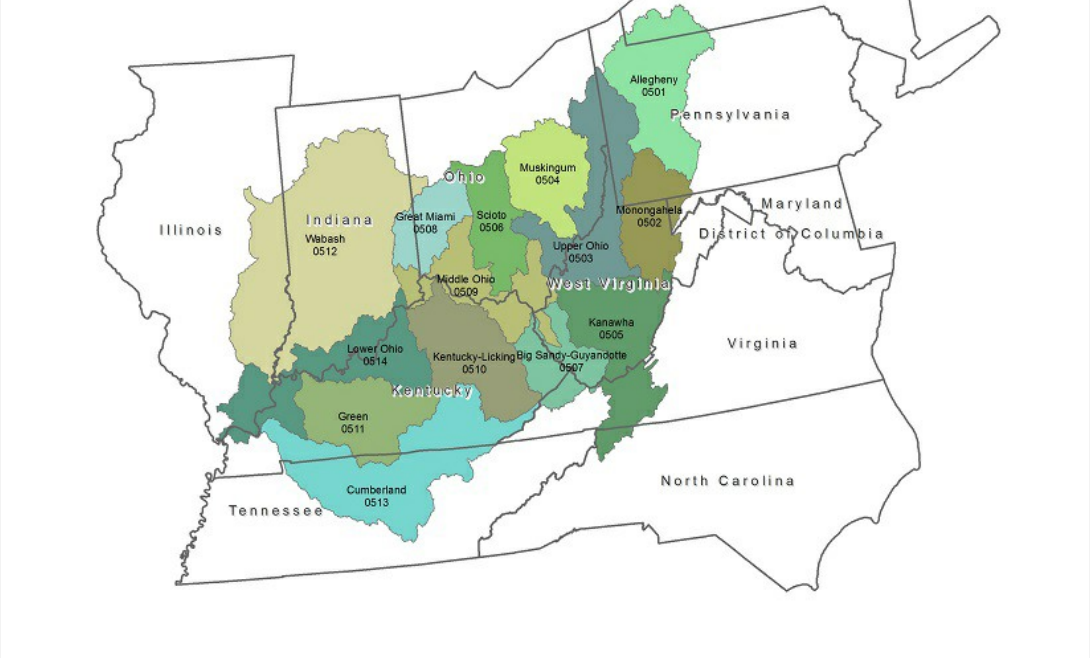
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0401 - Western Lake Superior
- [ ] 0402 - Southern Lake Superior-Lake Superior
- [ ] 0403 - Northwestern Lake Michigan
- [ ] 0404 - Southwestern Lake Michigan
- [ ] 0405 - Southeastern Lake Michigan
- [ ] 0406 - Northeastern Lake Michigan-Lake Michigan
- [ ] 0407 - Northwestern Lake Huron
- [ ] 0408 - Southwestern Lake Huron-Lake Huron
- [ ] 0409 - St. Clair-Detroit
- [ ] 0410 - Western Lake Erie
- [ ] 0411 - Southern Lake Erie
- [ ] 0412 - Lake Erie
- [ ] 0413 - Southwestern Lake Ontario
- [ ] 0414 - Southeastern Lake Ontario
- [ ] 0415 - Northeastern Lake Ontario-Lake Ontario-St. Lawrence
- [ ] All codes

Question 11c5. 05 Ohio

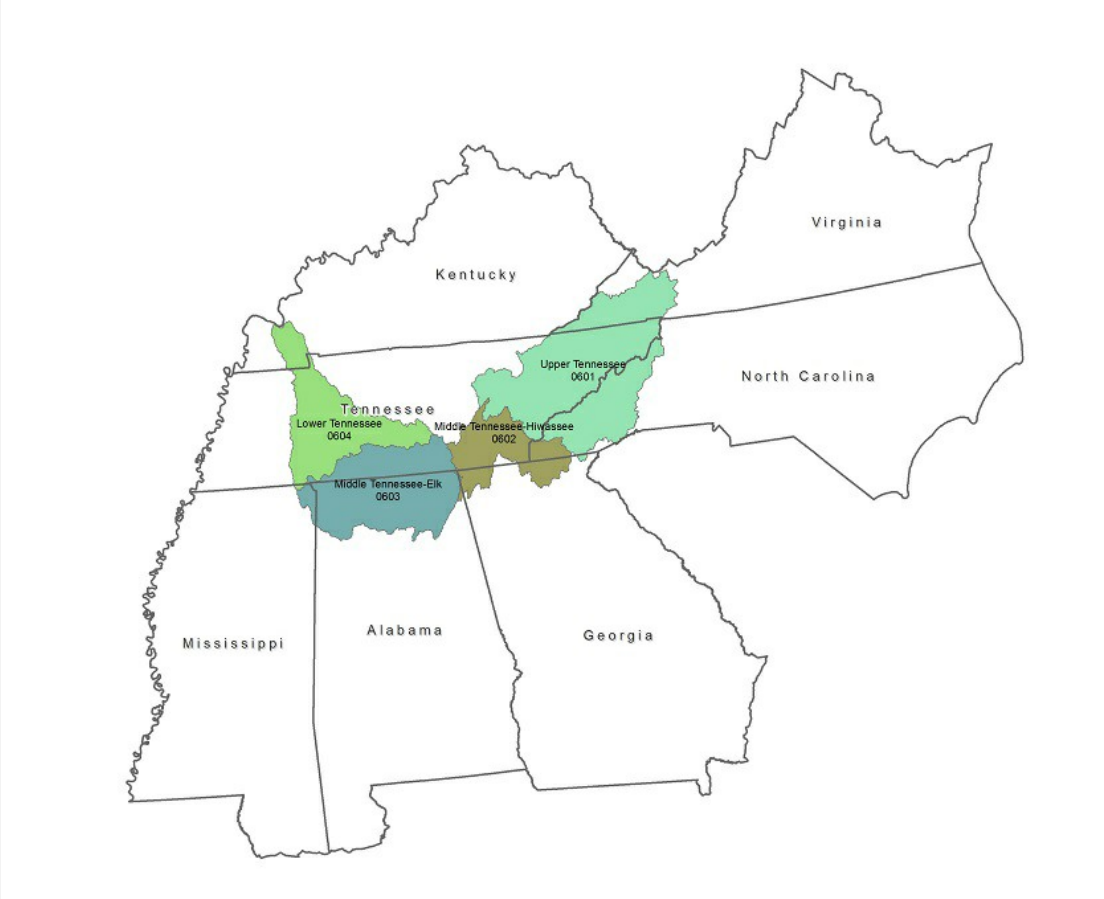
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0501 - Allegheny
- [ ] 0502 - Monongahela
- [ ] 0503 - Upper Ohio
- [ ] 0504 - Muskingum
- [ ] 0505 - Kanawha
- [ ] 0506 - Scioto
- [ ] 0507 - Big Sandy-Guyandotte
- [ ] 0508 - Great Miami
- [ ] 0509 - Middle Ohio
- [ ] 0510 - Kentucky-Licking
- [ ] 0511 - Green
- [ ] 0512 - Wabash
- [ ] 0513 - Cumberland
- [ ] 0514 - Lower Ohio
- [ ] All codes

Question 11c6. 06 Tennessee

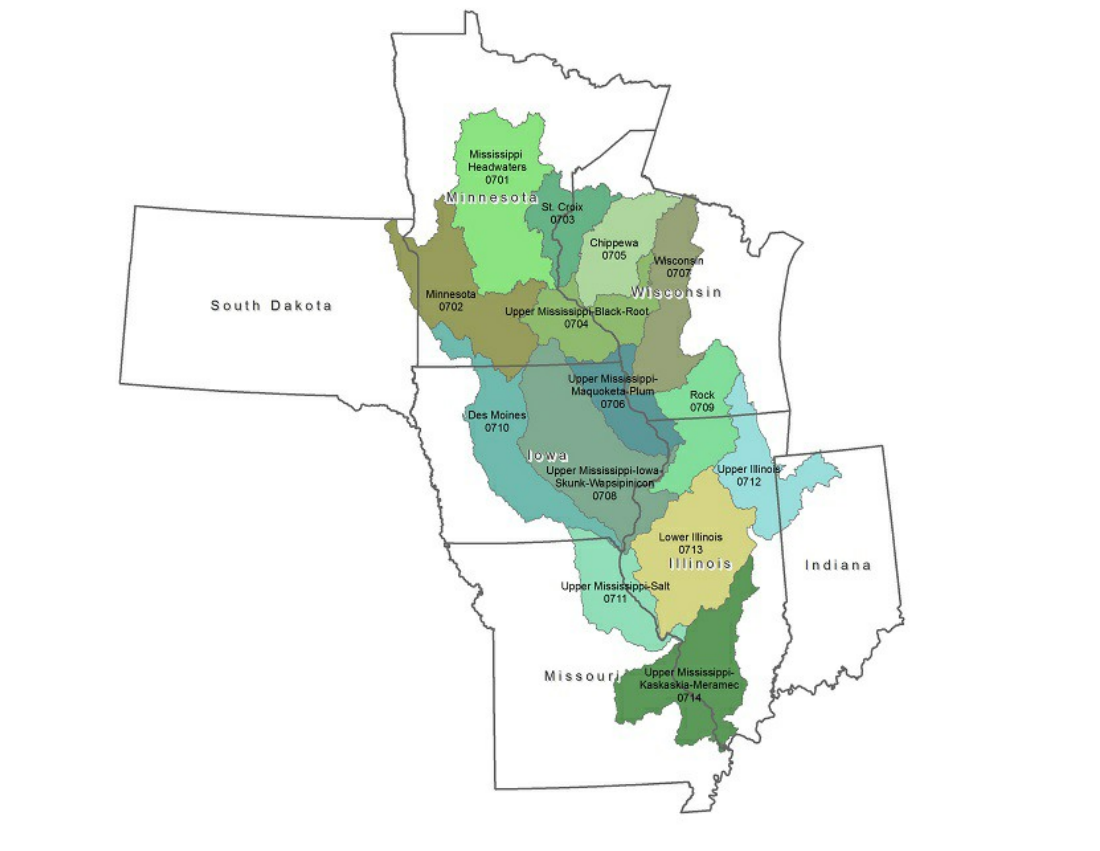
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0601 - Upper Tennessee
- [ ] 0602 - Middle Tennessee-Hiwassee
- [ ] 0603 - Middle Tennessee-Elk
- [ ] 0604 - Lower Tennessee
- [ ] All codes

Question 11c7. 07 Upper Mississippi

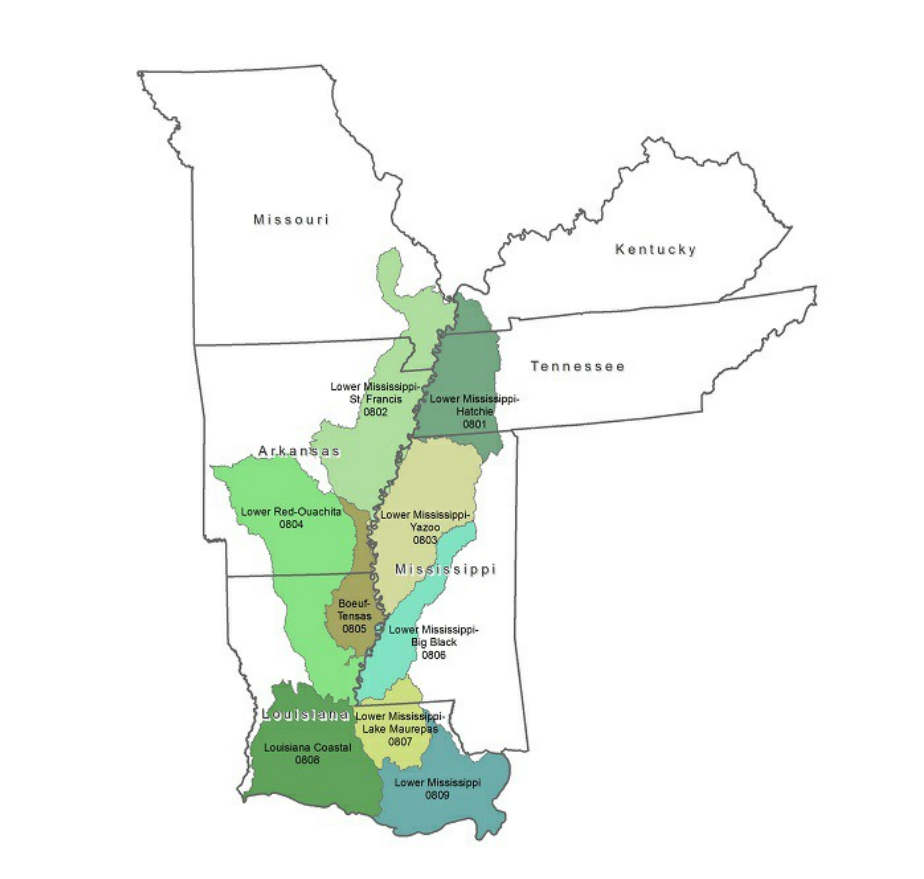
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0701 - Mississippi Headwaters
- [ ] 0702 - Minnesota
- [ ] 0703 - St. Croix
- [ ] 0704 - Upper Mississippi-Black-Root
- [ ] 0705 - Chippewa
- [ ] 0706 - Upper Mississippi-Maquoketa-Plum
- [ ] 0707 - Wisconsin
- [ ] 0708 - Upper Mississippi-Iowa-Skunk-Wapsipinicon
- [ ] 0709 - Rock
- [ ] 0710 - Des Moines
- [ ] 0711 - Upper Mississippi-Salt
- [ ] 0712 - Upper Illinois
- [ ] 0713 - Lower Illinois
- [ ] 0714 - Upper Mississippi-Kaskaskia-Meramec
- [ ] All codes

Question 11c8. 08 Lower Mississippi

Please select individual HUC-4 codes for your specific hydrologic units.

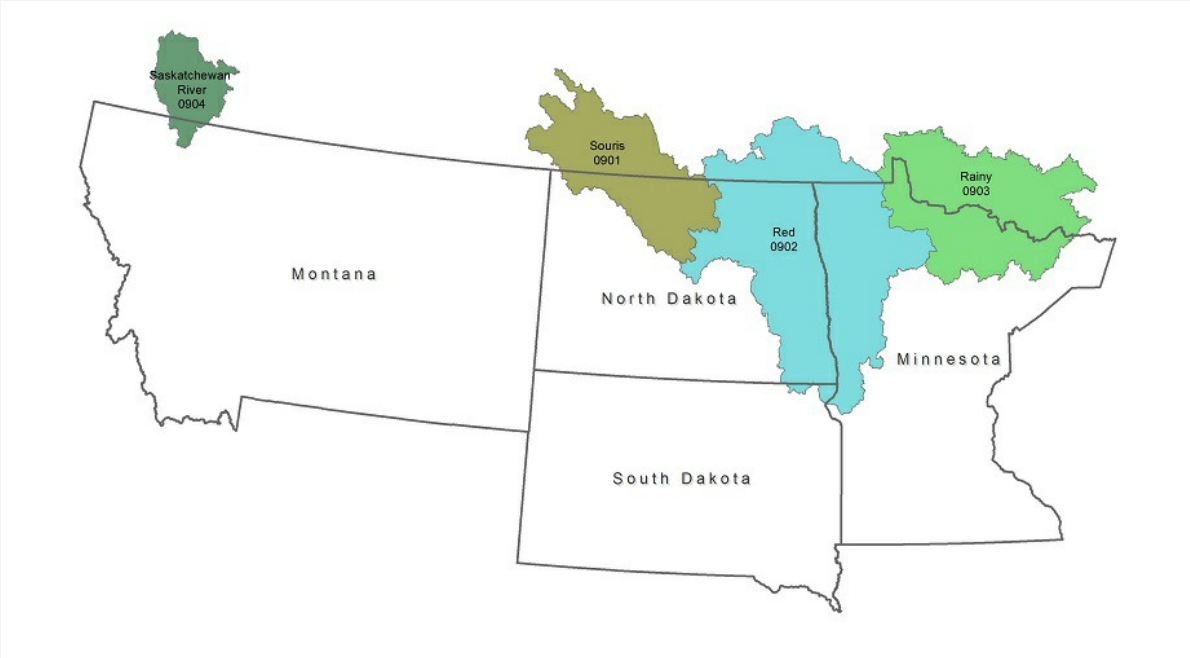


- [ ] 0801 - Lower Mississippi-Hatchie
- [ ] 0802 - Lower Mississippi-St. Francis
- [ ] 0803 - Lower Mississippi-Yazoo
- [ ] 0806 - Lower Mississippi-Big Black
- [ ] 0807 - Lower Mississippi-Lake Maurepas
- [ ] 0808 - Louisiana Coastal

- [ ] 0804 - Lower Red-Ouachita
- [ ] 0805 - Boeuf-Tensas
- [ ] 0809 - Lower Mississippi
- [ ] All codes

Question 11c9. 09 Souris-Red-Rainy

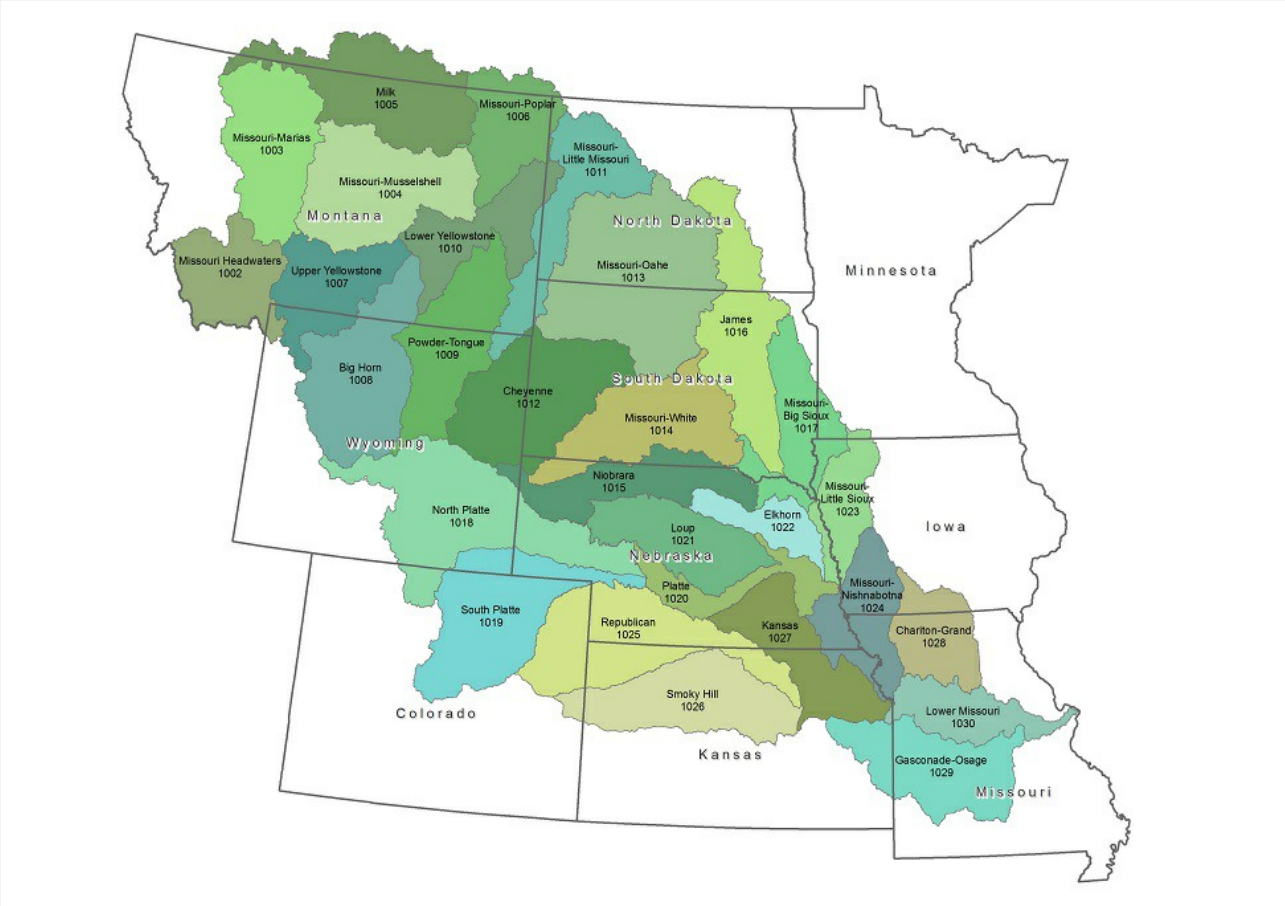
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0901 - Souris
- [ ] 0902 - Red
- [ ] 0903 - Rainy
- [ ] 0904 - Saskatchewan River
- [ ] All codes

Question 11c10. 10 Missouri

Please select individual HUC-4 codes for your specific hydrologic units.

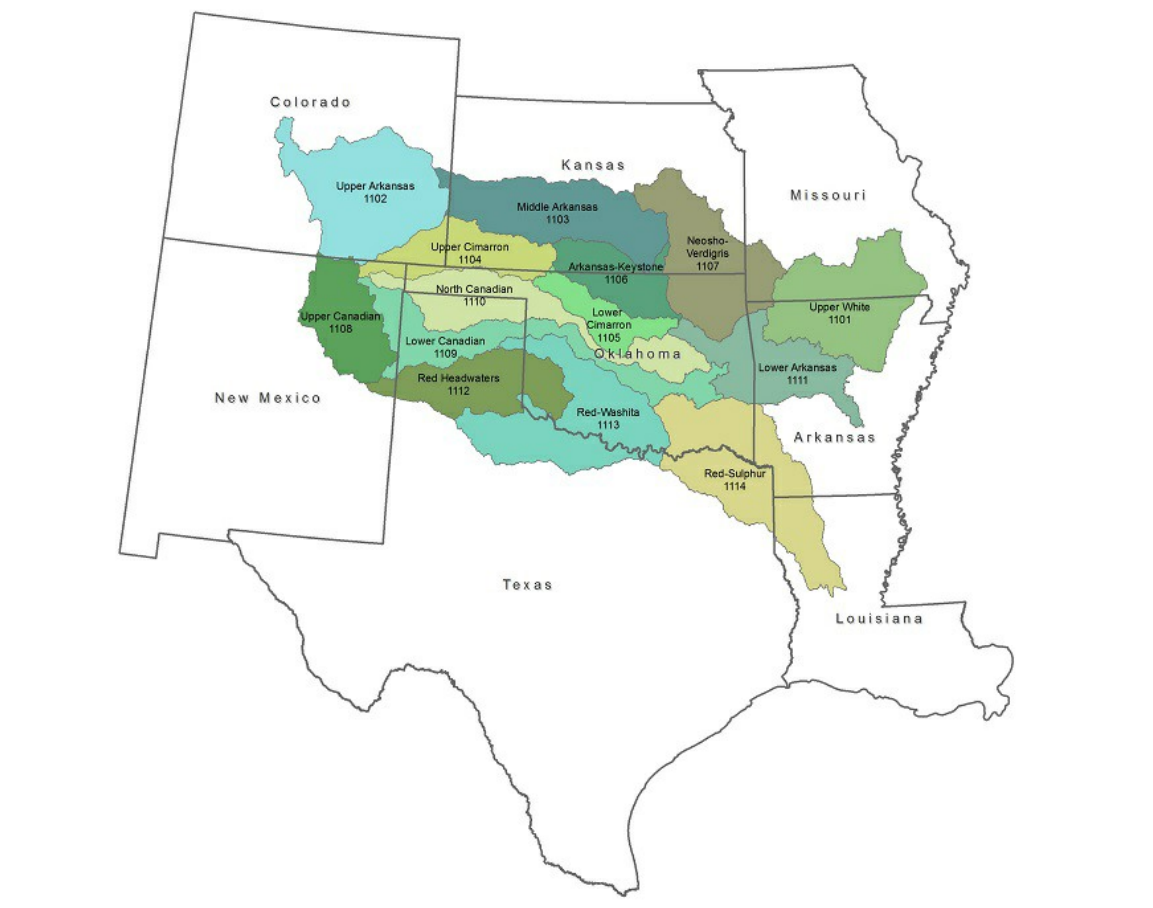


- [ ] 1002 - Missouri Headwaters
- [ ] 1003 - Missouri-Marias
- [ ] 1004 - Missouri-Musselshell
- [ ] 1012 - Cheyenne
- [ ] 1013 - Missouri-Oahe
- [ ] 1014 - Missouri-White
- [ ] 1022 - Elkhorn
- [ ] 1023 - Missouri-Little Sioux
- [ ] 1024 - Missouri-Nishnabotna

- [ ] 1005 - Milk
- [ ] 1006 - Missouri-Poplar
- [ ] 1007 - Upper Yellowstone
- [ ] 1008 - Big Horn
- [ ] 1009 - Powder-Tongue
- [ ] 1010 - Lower Yellowstone
- [ ] 1011 - Missouri-Little Missouri
- [ ] 1015 - Niobrara
- [ ] 1016 - James
- [ ] 1017 - Missouri-Big Sioux
- [ ] 1018 - North Platte
- [ ] 1019 - South Platte
- [ ] 1020 - Platte
- [ ] 1021 - Loup
- [ ] 1025 - Republican
- [ ] 1026 - Smoky Hill
- [ ] 1027 - Kansas
- [ ] 1028 - Chariton-Grand
- [ ] 1029 - Gasconade-Osage
- [ ] 1030 - Lower Missouri
- [ ] All codes

Question 11c11. 11 Arkansas-White-Red

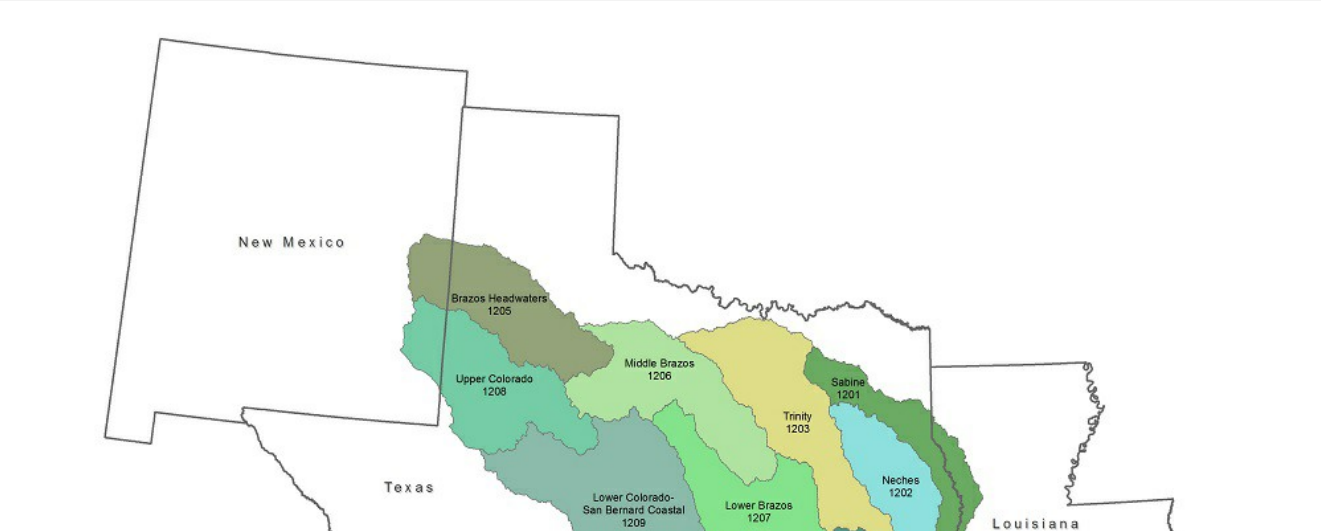
Please select individual HUC-4 codes for your specific hydrologic units.

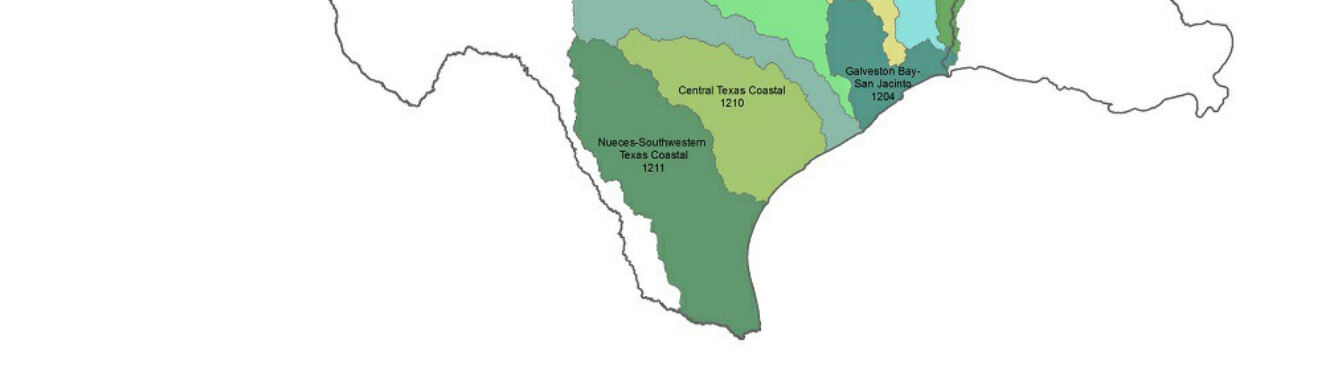


- [ ] 1101 - Upper White
- [ ] 1102 - Upper Arkansas
- [ ] 1103 - Middle Arkansas
- [ ] 1104 - Upper Cimarron
- [ ] 1105 - Lower Cimarron
- [ ] 1106 - Arkansas-Keystone
- [ ] 1107 - Neosho-Verdigris
- [ ] 1108 - Upper Canadian
- [ ] 1109 - Lower Canadian
- [ ] 1110 - North Canadian
- [ ] 1111 - Lower Arkansas
- [ ] 1112 - Red Headwaters
- [ ] 1113 - Red-Washita
- [ ] 1114 - Red-Sulphur
- [ ] All codes

Question 11c12. 12 Texas – Gulf

Please select individual HUC-4 codes for your specific hydrologic units.





- [ ] 1201 - Sabine
- [ ] 1202 - Neches
- [ ] 1203 - Trinity
- [ ] 1204 - Galveston Bay-San Jacinto
- [ ] 1205 - Brazos Headwaters
- [ ] 1206 - Middle Brazos
- [ ] 1207 - Lower Brazos
- [ ] 1208 - Upper Colorado
- [ ] 1209 - Lower Colorado-San Bernard Coastal
- [ ] 1210 - Central Texas Coastal
- [ ] 1211 - Nueces-Southwestern Texas Coastal
- [ ] All codes

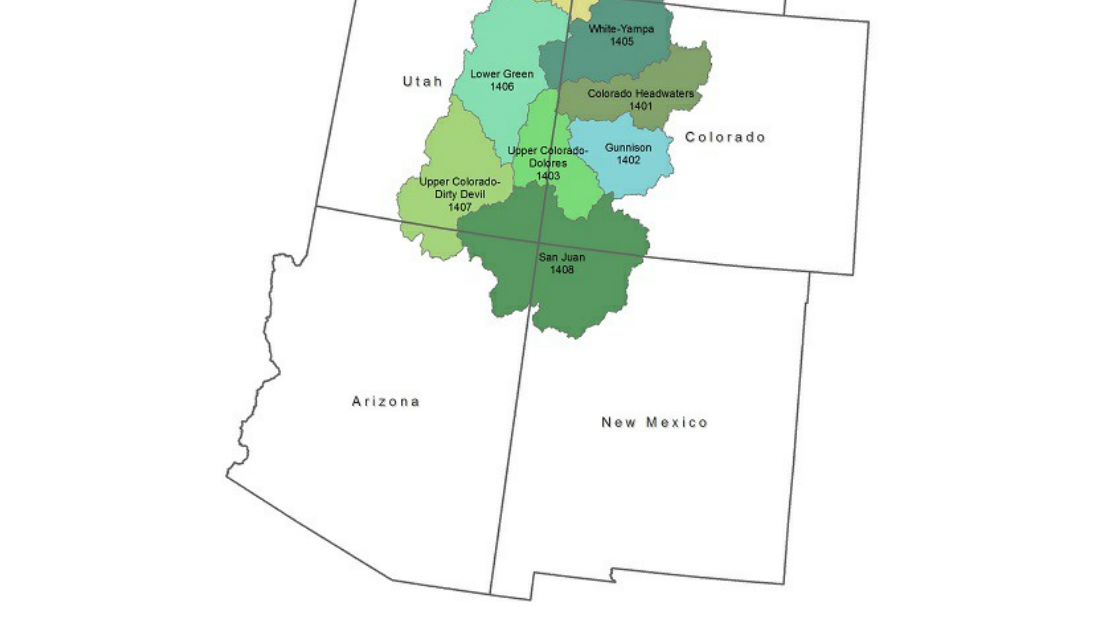
Question 11c13. 13 Rio Grande

Please select individual HUC-4 codes for your specific hydrologic units.

- [ ] 1301 - Rio Grande Headwaters
- [ ] 1302 - Rio Grande-Elephant Butte
- [ ] 1303 - Rio Grande-Mimbres
- [ ] 1304 - Rio Grande-Amistad
- [ ] 1305 - Rio Grande Closed Basins
- [ ] 1306 - Upper Pecos
- [ ] 1307 - Lower Pecos
- [ ] 1308 - Rio Grande-Falcon
- [ ] 1309 - Lower Rio Grande
- [ ] All codes

Question 11c14. 14 Upper Colorado

Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1401 - Colorado Headwaters
- [ ] 1402 - Gunnison
- [ ] 1403 - Upper Colorado-Dolores
- [ ] 1404 - Great Divide-Upper Green
- [ ] 1405 - White-Yampa
- [ ] 1406 - Lower Green
- [ ] 1407 - Upper Colorado-Dirty Devil
- [ ] 1408 - San Juan
- [ ] All codes

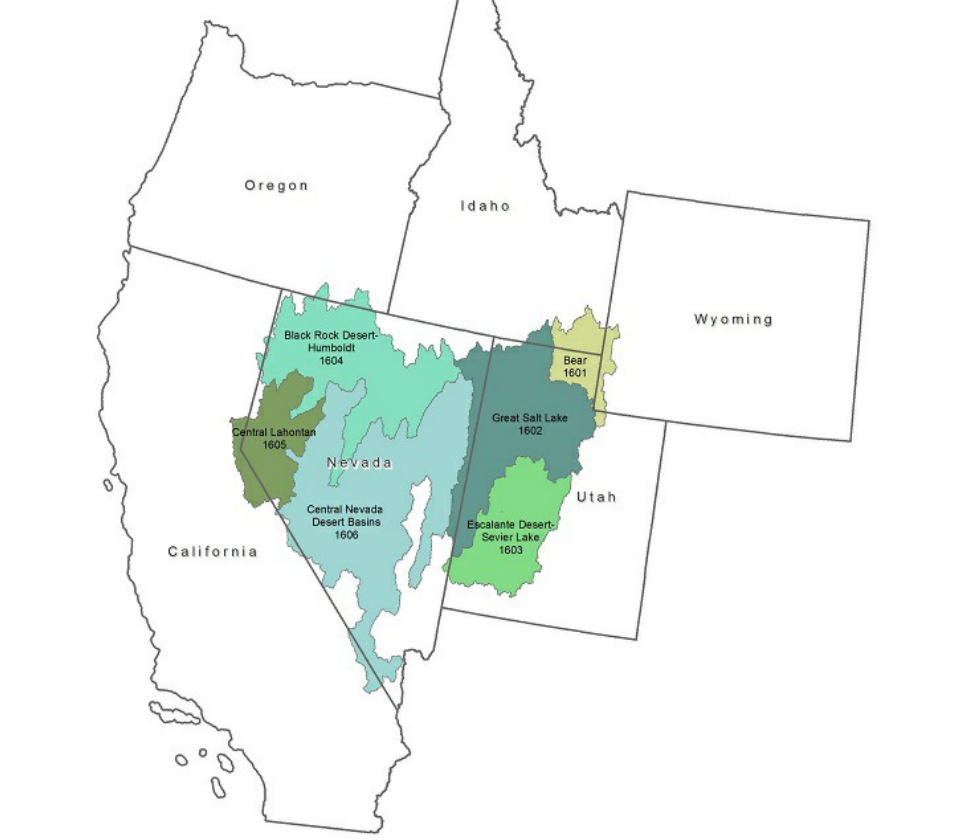
Question 11c15. 15 Lower Colorado

Please select individual HUC-4 codes for your specific hydrologic units.

- [ ] 1501 - Lower Colorado-Lake Mead
- [ ] 1502 - Little Colorado
- [ ] 1503 - Lower Colorado
- [ ] 1504 - Upper Gila
- [ ] 1505 - Middle Gila
- [ ] 1506 - Salt
- [ ] 1507 - Lower Gila
- [ ] 1508 - Sonora
- [ ] All codes

Question 11c16. 16 Great Basin

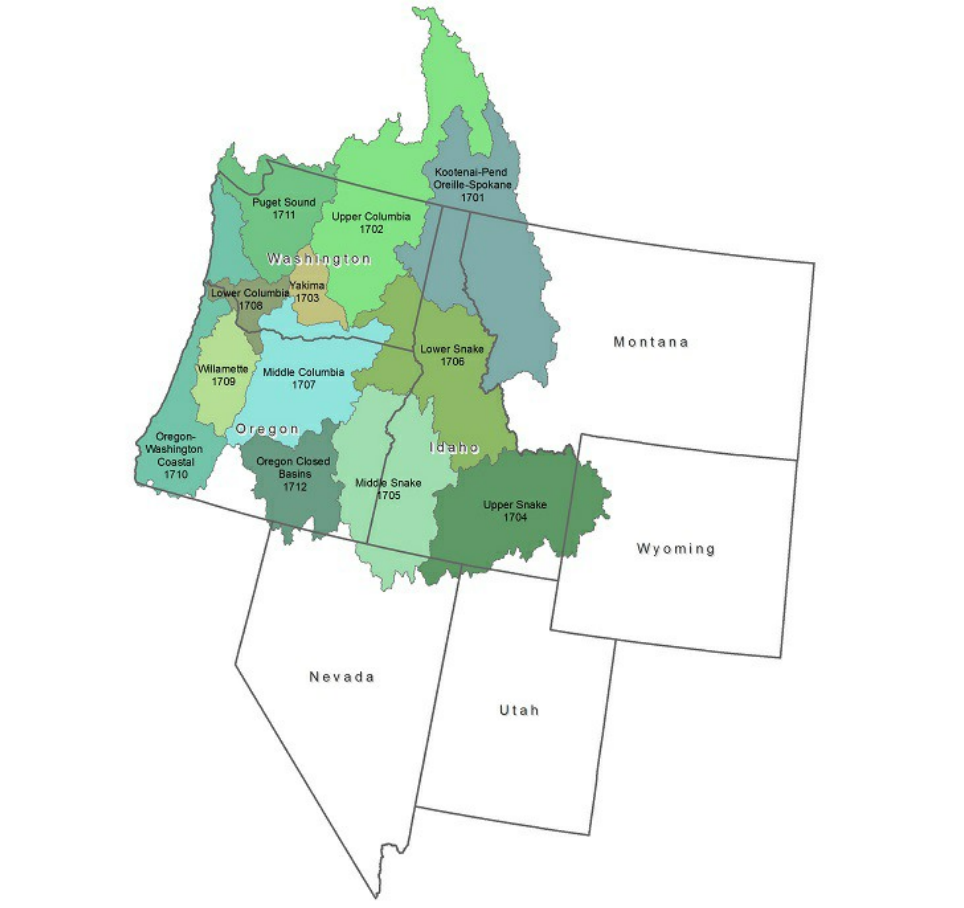
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1601 - Bear
- [ ] 1602 - Great Salt Lake
- [ ] 1603 - Escalante Desert-Sevier Lake
- [ ] 1604 - Black Rock Desert-Humboldt
- [ ] 1605 - Central Lahontan
- [ ] 1606 - Central Nevada Desert Basins
- [ ] All codes

Question 11c17. 17 Pacific Northwest

Please select individual HUC-4 codes for your specific hydrologic units.

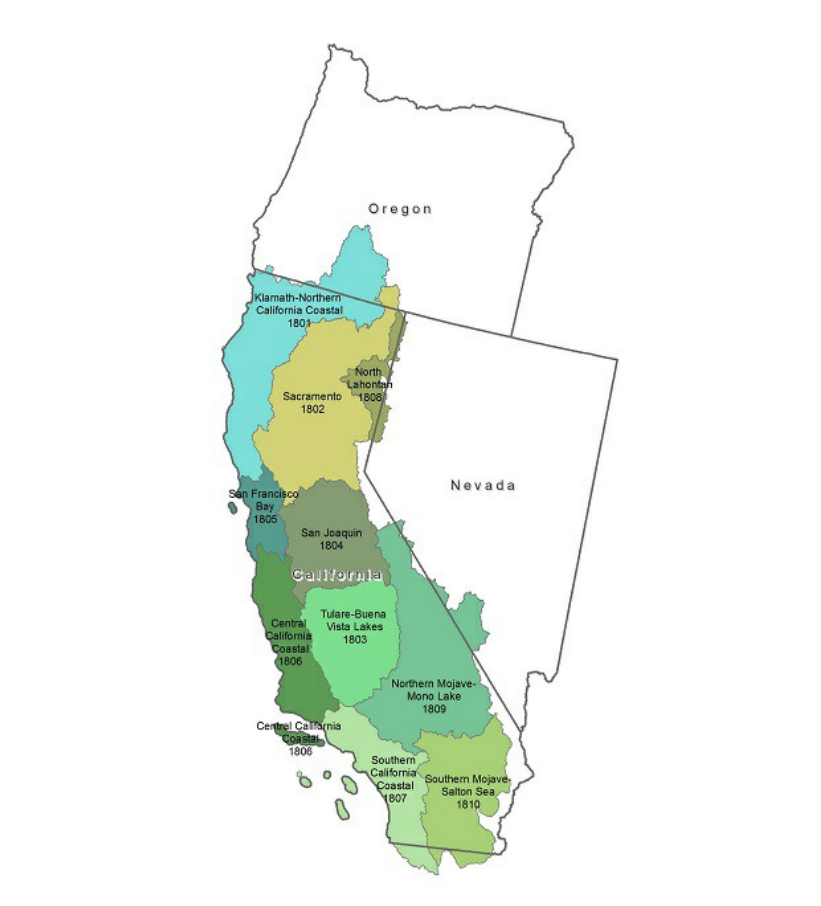


- [ ] 1701 - Kootenai-Pend Oreille-Spokane
- [ ] 1702 - Upper Columbia
- [ ] 1703 - Yakima
- [ ] 1704 - Upper Snake
- [ ] 1708 - Lower Columbia
- [ ] 1709 - Willamette
- [ ] 1710 - Oregon-Washington Coastal
- [ ] 1711 - Puget Sound

- [ ] 1705 - Middle Snake
- [ ] 1706 - Lower Snake
- [ ] 1707 - Middle Columbia
- [ ] 1712 - Oregon Closed Basins
- [ ] All codes

Question 11c18. 18 California

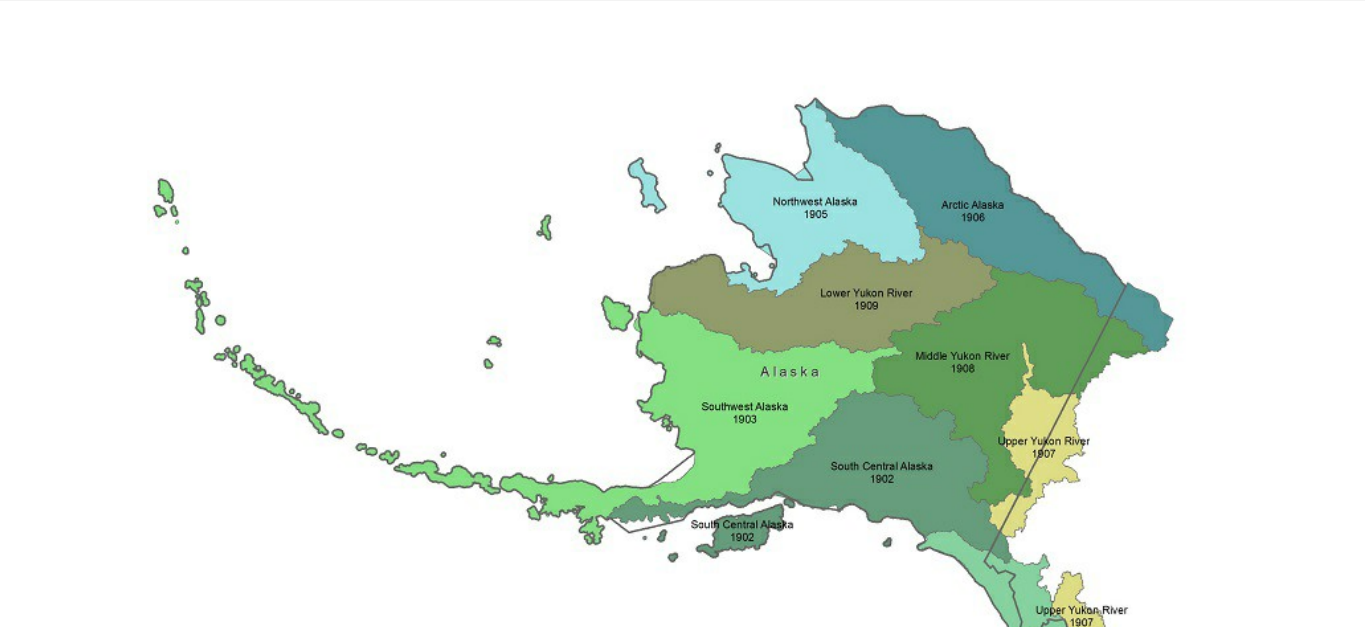
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1801 - Klamath-Northern California Coastal
- [ ] 1802 - Sacramento
- [ ] 1803 - Tulare-Buena Vista Lakes
- [ ] 1804 - San Joaquin
- [ ] 1805 - San Francisco Bay
- [ ] 1806 - Central California Coastal
- [ ] 1807 - Southern California Coastal
- [ ] 1808 - North Lahontan
- [ ] 1809 - Northern Mojave-Mono Lake
- [ ] 1810 - Southern Mojave-Salton Sea
- [ ] All codes

Question 11c19. 19 Alaska

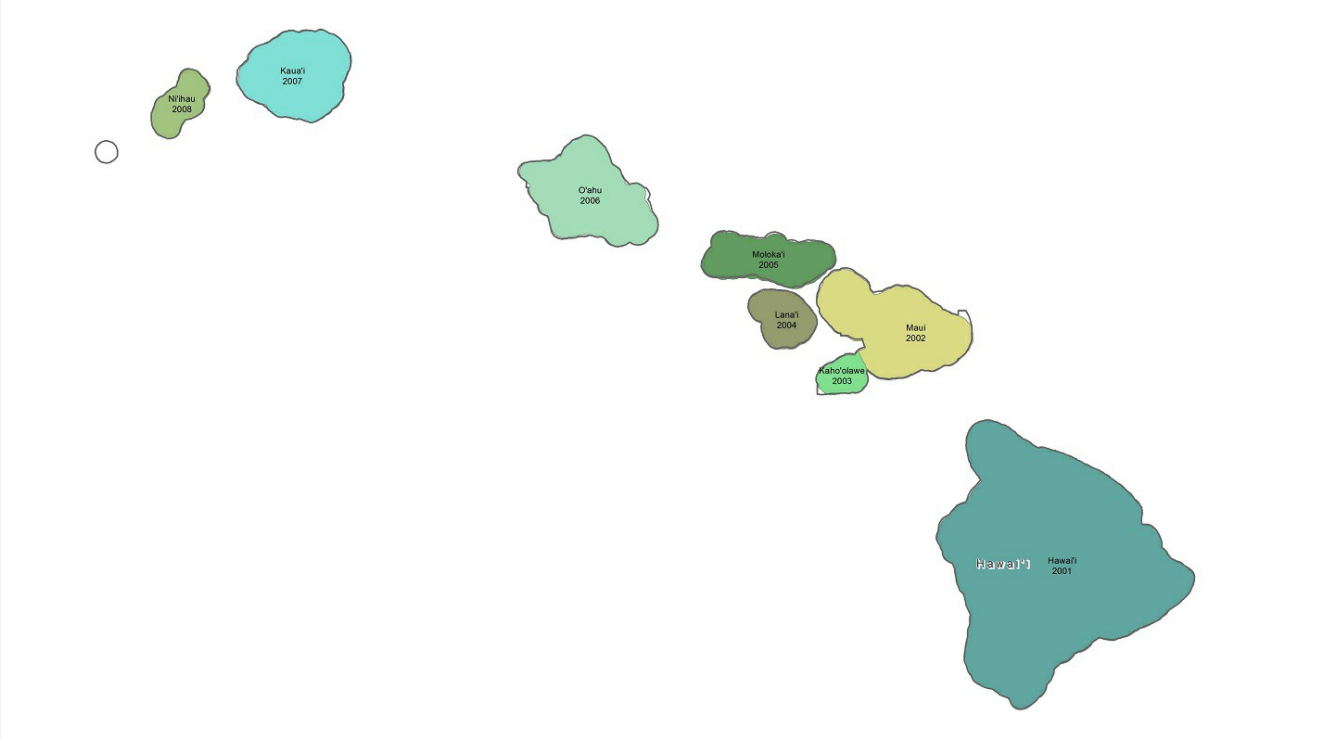
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1901 - Southeast Alaska
- [ ] 1905 - Northwest Alaska
- [ ] 1908 - Middle Yukon River
- [ ] 1902 - South Central Alaska
- [ ] 1906 - Arctic Alaska
- [ ] 1909 - Lower Yukon River
- [ ] 1903 - Southwest Alaska
- [ ] 1907 - Upper Yukon River
- [ ] All codes

Question 11c20. 20 Hawai'i

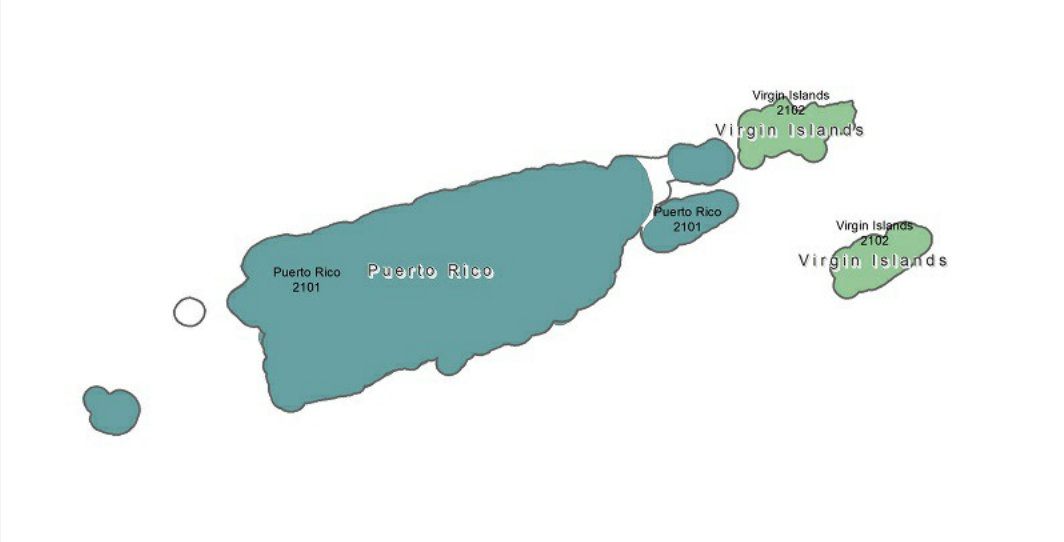
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 2001 - Hawai'i
- [ ] 2004 - Lana'i
- [ ] 2007 - Kaua'i
- [ ] 2002 - Maui
- [ ] 2005 - Moloka'i
- [ ] 2008 - Ni'ihau
- [ ] 2003 - Kaho'olawe
- [ ] 2006 - O'ahu
- [ ] All codes

Question 11c21. 21 Caribbean

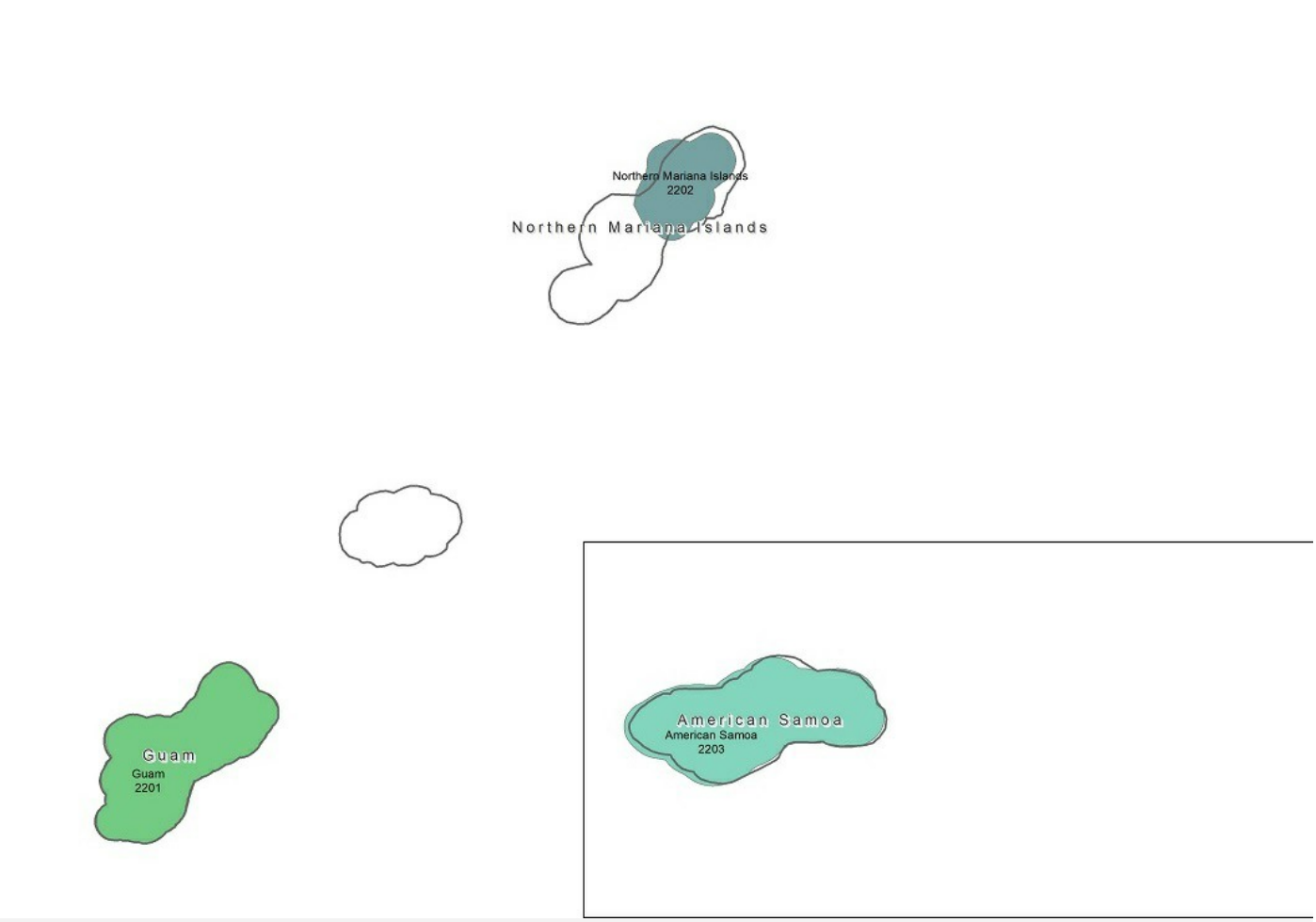
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 2101 - Puerto Rico
- [ ] 2102 - Virgin Islands
- [ ] All codes

Question 11c22. 22 Pacific Islands

Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 2201 - Guam
- [ ] 2203 - American Samoa
- [ ] 2202 - Northern Mariana Islands
- [ ] All codes

***Question 11d. If your geographic area requirements for inland topography pertain to Federally-owned or Tribal lands, please designate below. Please select all that are required.**

- [ ] All Federally owned lands
- [ ] American Indian reservations, off-reservation trust lands, Alaska Native areas, and Hawaiian home lands
- [ ] Bureau of Land Management (BLM)
- [ ] Bureau of Reclamation
- [ ] Department of Defense (DOD)
- [ ] National Park Service (NPS)
- [ ] Tennessee Valley Authority (TVA)
- [ ] U.S. Forest Service (USFS)
- [ ] U.S. Fish and Wildlife Service (USFWS)
- [ ] Other (enter name and/or description):

***Question 11e. If applicable, please submit your geographic area requirements for inland topography by emailing your shapefile(s), KML, or geodatabase to the project team at 3DNationStudy@usgs.gov and provide a unique filename that includes your organization and Mission Critical Activity, or abbreviations thereof (e.g., MN_DNR_stormwater_mgt or EPA_eBeaches). The projection and datum (.prj file) information must be included. Please enter the filename below. See FAQ #6.**

Question 12. What amount of horizontal error is acceptable in your 3D topographic data? In other words, what is the needed Total Horizontal Uncertainty (THU) of your inland 3D topographic data at the 95% confidence level? Check one. See FAQ #7 for background information.

- ( ) Less than 20 cm
- ( ) Up to 30 cm
- ( ) Up to 40 cm
- ( ) Up to 50 cm
- ( ) Up to 60 cm

- Up to 80 cm
- Up to 1 meter
- Up to 2 meters
- Up to 5 meters
- Up to 10 meters
- Up to 20 meters
- Greater than 20 meters
- The best horizontal accuracy achievable for the vertical accuracy I need
- I don't know

Question 13. What amount of vertical error is acceptable in your 3D topographic data? In other words, what is the needed Total Vertical Uncertainty (TVU) of your inland 3D topographic data at the 95% confidence level? Check one. See FAQ #8 for background information.

- Less than 5 cm
- Up to 10 cm
- Up to 20 cm
- Up to 30 cm
- Up to 40 cm
- Up to 50 cm
- Up to 60 cm
- Up to 80 cm
- Up to 1 meter
- Greater than 1 meter
- I don't know

Question 14. For areas near the coast, how far down the beach profile do you need 3D topographic data to support your Mission Critical Activity? Check only one. See FAQ #9.

- To Mean Higher High Water (MHHW)
- To Mean High Water (MHW)
- To Mean Lower Low Water (MLLW)
- Below MLLW
- Not applicable
- Other (please describe):

Please be patient, this question can take up to 30 seconds to load.

Question 15a. For the inland topographic portion of your Mission Critical Activity, do cross sections and/or transects meet your requirements for topographic data? Please select one. See FAQ #10.

- Yes, for the entire Area of Interest for my Mission Critical Activity
- Yes, for part of my Area of Interest
- No, I need a continuous surface of topographic data

Question 15b. Please specify the vertical accuracy and longitudinal sampling density required for the cross sections. If your cross section requirement is for a portion of the Area of Interest for your Mission Critical Activity, please also describe where you require cross sections.

***Question 15c. What 3D topographic data Quality Level (QL) do you require for the inland topographic portion of your Mission Critical Activity? Check one QL only, chosen from the table below. See FAQ #11.**

Quality Level (QL)	Aggregate Nominal Pulse Spacing (ANPS) (cm)	Aggregate Nominal Pulse Density (ANPD) (pts/m^2)	$RMSE_z$ (non-vegetated) (cm)	NVA at 95% confidence level (cm)	VVA at 95th percentile (cm)
QL0 HD	≤22	≥20	≤5	≤9.8	≤15.0
QL0	≤35	≥8	≤5	≤9.8	≤15.0
QL1 HD	≤22	≥20	≤10	≤19.6	≤30.0
QL1	≤35	≥8	≤10	≤19.6	≤30.0

QL2	≤71	≥2	≤10	≤19.6	≤30.0
QL5*	≤500	≥0.04	≤100	≤196	≤300

*Only applicable for IfSAR in Alaska

- ○ QL0 HD: RMSEz ≤ 5 cm and aggregate nominal pulse density ≥20 points/square meter
- ○ QL0: RMSEz ≤ 5 cm and aggregate nominal pulse density ≥8 points/square meter
- ○ QL1 HD: RMSEz ≤ 10 cm and aggregate nominal pulse density ≥20 points/square meter
- ○ QL1: RMSEz ≤ 10 cm and aggregate nominal pulse density ≥8 points/square meter
- ○ QL2: RMSEz ≤ 10 cm and aggregate nominal pulse density ≥2 points/square meter
- ○ QL5: RMSEz ≤ 100 cm and aggregate nominal pulse density ≥0.04 points/square meter (only applicable in Alaska)
- ○ I do not need any of the QLs listed. Coarser 3D topographic data satisfies my needs.
- ○ I don't know

***Question 16. For the inland topography portion of your Mission Critical Activity, how frequently do the inland 3D topographic data need to be updated to satisfy your requirements? Stated another way, your Mission Critical Activity requires data no older than: Please select one. See FAQ #12.**

- ○ Annually (one year)
- ○ 2-3 years
- ○ 4-5 years
- ○ 6-10 years
- ○ >10 years
- ○ Event driven only – Data need to coincide with a specific event
- ○ Other (please describe):

Question 17. For the inland topography portion of your Mission Critical Activity, do the Quality Level (or cross section/transect vertical accuracy and sampling density) and update frequency you just specified apply to the entire geographic Area of Interest you specified? An example might be someone who specified an Area of Interest as the State of Florida, but whose requirements are for QL2 data for the Florida Keys and QL1 data for the mainland areas, each updated every 5 years. Another example might be someone who specified an Area of Interest as the 48 conterminous states, but who requires QL0 data updated every 2 years for the forested areas and QL2 data updated every 5 years for the non-forested areas.

- ○ Yes, my Quality Level and update frequency requirements apply to my entire Area of Interest
- ○ No, my Quality Level and update frequency requirements vary across my Area of Interest. Please describe:

Question 18. For the Mission Critical Activity that you specified, please describe *how important* the different forms of hydrologic processing of your inland 3D topographic data are to your activity. See FAQ #13.

Importance rating: Required; Highly desirable; Nice to have; Not required

	Required	Highly desirable	Nice to have	Not required
Hydrologic Processing Form				
Hydro-flattening	○	○	○	○
Hydro-enforcement	○	○	○	○
Hydro-conditioning	○	○	○	○
No Treatment	○	○	○	○

Question 19a. For the Mission Critical Activity that you specified, please describe the importance of seamless integration within the topographic data for your Area of Interest (AOI). For each type of data integration, identify how important it is that data are integrated across/between the different topographic data collects that are often required to obtain topographic data for an entire AOI. Examples of data integration would be data collected at the same time (temporal integration) or data that spatially align between adjacent geographic areas (spatial integration). See FAQ #14.

Importance rating: Required; Highly desirable; Nice to have; Not required

	Seamless integration between topographic data collections across your Area of Interest			
	Required	Highly desirable	Nice to have	Not required
Temporal Integration				
Entire AOI needs to be collected in the same acquisition season (e.g. Fall 2018), regardless of environmental conditions	○	○	○	○
Entire AOI needs to be collected under similar environmental conditions (e.g., similar low streamflow conditions, leaf off, leaf on, etc.)	○	○	○	○
Other (please describe an	○	○	○	○
Spatial Integration				
Point Cloud for entire AOI needs to be seamless (e.g., no obvious cliffs or voids where datasets join)	○	○	○	○
Digital Elevation Model for entire AOI needs to be seamless (e.g., no cliffs or voids where datasets join)	○	○	○	○
Other (please describe an	○	○	○	○

Question 19b. If you indicated you wanted seamless spatial integration within the topographic data for your Area of Interest, what level of vertical manipulation are you willing to accept to achieve seamlessness? Check one. See FAQ #15 for background information.

- ○ Up to the required Total Vertical Uncertainty (TVU) at the 95% confidence level
- ○ Up to double the required TVU at the 95% confidence level
- ○ Up to triple the required TVU at the 95% confidence level
- ○ Whatever it takes to achieve seamlessness, including changes to the older, previously accepted collection and/or dataset if it is proven to be less accurate than the newer
- ○ I don't know
- ○ Other (please describe):

Question 20. For the Mission Critical Activity that you specified, please describe the importance of the following inland 3D topographic data products. For each data product, identify *how important* the 3D topographic data product is to your Mission Critical Activity. See FAQ #16.

Importance rating: Required; Highly desirable; Nice to have; Not required

	Required	Highly desirable	Nice to have	Not required
Data Products				
Digital Surface Model (DSM) of the top reflective surface	○	○	○	○
Digital Terrain Model (DTM) of the bare-earth terrain	○	○	○	○
Digital Elevation Model (DEM)	○	○	○	○
Raw point cloud data	○	○	○	○
Classified point cloud data (LAS classes)	○	○	○	○
Full waveform	○	○	○	○
Breaklines required for standard hydro-flattening	○	○	○	○
Additional breaklines required for hydro-enforcement of culverts	○	○	○	○
Intensity imagery	○	○	○	○
Ground control/ground truthing	○	○	○	○
Other (please describe an	○	○	○	○

Question 21. For the Mission Critical Activity that you specified, please describe the importance of integrating your inland 3D topographic data with other datasets. For each data type, identify *how important* the data integration is to your Mission Critical Activity. Examples of data integration would be data that align either spatially and/or temporally or attribute codes that are logically consistent. See FAQ #17.

Importance rating: Required; Highly desirable; Nice to have; Not required

	Required	Highly desirable	Nice to have	Not required
Data Type				
Aerial and/or satellite imagery	○	○	○	○
Geologic and/or seismic data	○	○	○	○
Shorelines - current, historic, change rates	○	○	○	○
Land Use/Land Cover	○	○	○	○
Wetlands	○	○	○	○
Inland surface water features (streams, lakes, ponds, reservoirs)	○	○	○	○
Bridges/culverts	○	○	○	○
Landmark features	○	○	○	○
Cultural resources	○	○	○	○
Coastal and riverine structures - shoreline stabilization structures, levees, dams, jetties, piers, weirs, etc.	○	○	○	○
Lowest floor elevation of buildings	○	○	○	○
Other (please describe an	○	○	○	○

Question 22a. For the inland topography portion of your Mission Critical Activity, please describe the 3D topographic data are you currently using. Please include information about its Quality Level and date if known. Please enter text. See FAQ #18 for information about how to identify available data.

Please be patient, this question can take up to 30 seconds to load.

Question 22b. For the inland topography portion of your Mission Critical Activity, please tell us where you access topographic data. Check all that apply. See FAQ #19.

- ☐ The National Map

- [ ] Digital Coast
- [ ] NOAA National Centers for Environmental Information (NCEI)
- [ ] Open Topography
- [ ] State Repository (ies)
- [ ] Other (please describe):

Question 22b1. Please describe which State Repository (ies) you utilize.

Question 22c. What benefits relative to your program are you now realizing from *currently available* inland 3D topographic data? Check the option that most closely describes the benefits for each benefit type. See benefits example document for more information.

	Major	Moderate	Minor	None	Don't know
Current Benefits from existing inland 3D topographic data					
Operational Benefits					
Time savings					
Cost savings or cost reduction (i.e. savings on purchases)					
Cost avoidance					
Increased revenues to the organization					
Mission-driven performance improvements					
Customer Service Benefits					
Value added to products or services					
Improved response or timeliness					
Improved customer experience					
Societal Benefits					
Education or outreach					
Environmental benefits					
Public safety, including life and property					
Other (please describe in your own words)					
Please describe					

Question 23. The following series of tables apply to the FUTURE benefits that your program would gain from inland 3D topographic elevation data if ALL of the requirements you provided above could be met for the selected Mission Critical Activity. The future benefits are broken into three main categories: Operational, Customer Service, and Societal, and then into subcategories (e.g. Time savings, Cost Avoidance, etc). Each subcategory contains potential types of benefits. If you have another category and/or type of benefit not provided below, please write in your own response. See benefits example document for more information.

For each benefit type please indicate the following:

- Benefits your program is likely to receive - Select the option that most closely describes the magnitude of benefits your program is likely to receive for each benefit type, on a scale from 'None' to 'Major'. 'Don't know' is also an option.

- Quantification of Benefits - Please quantify any operational and/or customer service benefits you are likely to receive. Each benefit subcategory has its own quantification metric (e.g. Time Savings is type of hours saved (annual or monthly) and amount of those hours saved (e.g. 80)).

- Briefly Describe the Benefit

1. Briefly describe any major benefits. A few examples are provided as follows: fewer field visits would be required, or having authoritative data readily downloadable from a single site would save work hours, or we could perform more accurate and efficient modeling, or improved data would improve our ability to protect critical habitat areas.
2. For benefits you quantified, also briefly describe how you quantified the benefit. For example: fewer field visits would be required, 2 hours/field visit for 200 fewer field visits a year = 400 annual hours saved.

	Benefits your program is likely to receive					Hours Saved				Amount of Hours Saved	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D inland topographic data											
Time Savings											
Hours saved from faster and/or avoided field visits/inspections.											
Hours saved through more efficient modeling, reviews, reporting, data dissemination, mapping, or other procedures											
Hours saved from reduced or avoided data manipulation (e.g., combining data from multiple sources; changing projection, datum, etc.)											
Hours saved from reduced or avoided data errors											
Hours saved through in-office project planning or monitoring											
Hours saved from more streamlined operations (e.g., permitting processes, offshore boundary determinations, etc.)											
Other (please describe)											

	Benefits your program is likely to receive					Dollars Saved				Amount of Dollars Saved	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual dollars saved	Monthly dollars saved	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D inland topographic data											
Cost Savings or Cost Reduction (i.e. savings on purchases)											
Data acquisition costs saved, reduced or available to spend on other projects											
Materials saved (e.g., fertilizer, pesticides, water, irrigation systems, pond design, beach/dune restoration, building/construction materials, etc.)											
Other (please describe)											

	Benefits your program is likely to receive					Dollars Saved				Amount of Dollars Saved	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual dollars saved	Monthly dollars saved	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D inland topographic data											
Cost Avoidance											
Data processing avoided (e.g., classifying point clouds, quality control, hydrotreatment, etc.)											
Data errors avoided											
Avoided loss of property due to natural hazards or disaster events											
Avoided accidents caused by human error due to lack of information (e.g. crashes, aviation incidents, marine accidents, oil spills)											
Other (please describe)											

	Benefits your program is likely to receive					Dollars Realized/Earned				Amount of Dollars Realized/Earned	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual dollars realized	Monthly dollars realized	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D inland topographic data											
Increased Revenues to the Organization											
Improved harvest or extraction yields (e.g., timber, agriculture, fisheries, minerals, oil/gas, etc.)											
Increased cargo carrying capacity											
New products, services, or applications/apps sold											
Other (please describe)											

	Benefits your program is likely to receive					Improvement				Percent Improvement	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual Percent Improvement		I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D inland topographic data											
Mission-driven Performance Improvements											
Increased program effectiveness											
Improved ability to carry out mission											
Improved decision making due to better data, modeling, etc.											
Other (please describe)											

	Benefits your program is likely to receive					Hours/Dollars Saved						Amount of Hours/Dollars Saved	Comments
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved	Monthly dollars saved	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D inland topographic data													
Other (please describe in your own words)													
Please describe													

	Benefits your program is likely to receive					Hour/Dollar Benefits						Amount of Hours/Dollars Saved	Please
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved/dollars realized	Monthly dollars saved/dollars realized	I don't know how to estimate	Unable to provide		
Future Customer Service Benefits from 3D inland topographic data													
Value Added to Products or Services (Benefits to the Customer/User)													

New products, services or applications/apps (e.g., solar or green roof potential, GPS navigation, recreation opportunities, etc.)													
Improved accuracy of products or services (e.g. navigation charts, nautical charts, shoreline delineation, flood hazard maps, flood warnings, etc.)													
Other (please describe)													

	Benefits your program is likely to receive					Hour/Dollar Benefits						Amount of Hours/Dollars Saved	Please
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved/dollars realized	Monthly dollars saved/dollars realized	I don't know how to estimate	Unable to provide		
Future Customer Service Benefits from 3D inland topographic data													
Improved Response or Timeliness (Benefits to the Customer/User)													
Faster reviews and approvals (e.g., permitting approval, EIS reviews, boundary determinations, etc.)													
Faster response to an incident or event (e.g., faster access to impacted areas, faster response and recovery operations, improved evacuation plans, etc.)													
Faster recovery after an event (e.g., faster port reopening after hurricane, faster identification of damaged structures, faster information about Advisory Base Flood Elevations, etc.)													
Improved customer assistance (e.g., use of data allows virtual view and support via phone, email, chat)													
More up to date services or products (e.g., nautical charts, navigation charts, flood hazard maps, etc.)													
Improved projections of at-risk locations and/or faster warning to the public of impending natural or man-made hazards (e.g., flood, fire, tsunami, active shooter, etc.)													
Other (please describe)													

	Benefits your program is likely to receive					Hour/Dollar Benefits						Amount of Hours/Dollars Saved	Please
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved/dollars realized	Monthly dollars saved/dollars realized	I don't know how to estimate	Unable to provide		
Future Customer Service Benefits from 3D inland topographic data													
Improved Customer Experience													
Increased customer confidence in products or services													
New services, tools, or applications/apps													
Better data availability (faster downloads, data are													

all in one place, etc.)

Other (please describe)													

	Benefits your program is likely to receive					Hour/Dollar Benefits						Amount of Hours/Dollars Saved	C
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved/dollars realized	Monthly dollars saved/dollars realized	I don't know how to estimate	Unable to provide		
Future Customer Service Benefits from 3D inland topographic data													
Other (please describe in your own words)													
Please describe													

	Benefits your program is likely to receive					Please describe in your own words:
	Major	Moderate	Minor	None	Don't know	
Future Societal Benefits from 3D inland topographic data						
Societal Benefits						
Education or outreach						
Environmental benefits						
Public safety, including life and property						

	Benefits your program is likely to receive					Comments
	Major	Moderate	Minor	None	Don't know	
Future Societal Benefits from 3D inland topographic data						
Other (please describe in your own words)						
Please describe						

If you have additional Mission Critical Activities that require 3D elevation data, please use the same survey link provided to you and repeat the questionnaire for any additional Mission Critical Activities you have.

Thank you for responding to this 3D Nation Elevation Requirements and Benefits Study questionnaire. The information that you have provided will be summarized for the Federal Agency, State, Territory, Tribe, or non-governmental organization that you represent. The Point of Contact for your organization will then have an opportunity to review and edit the summary requirements that will feed into the final 3D Nation study report. The final study report will be the primary source of information used to develop recommendations for a 3D Nation, which unites terrestrial and coastal/ocean mapping efforts from the highest mountains to the deepest oceans to ensure public access to an accurate, authoritative national elevation dataset. If you have any comments about the 3D Nation please contact Ashley Chappell at 3DNationStudy@usgs.gov.

Part 3.2 - Questions for Inland Bathymetry Requirements

***Please be patient, this question can take up to 30 seconds to load.**

Question 24. In this section, please identify the geographic area requirements for the inland bathymetry portion of your Mission Critical Activity described above. We need to understand geographic area requirements for each Mission Critical Activity. Questionnaire participants are encouraged to describe their geographic (area of coverage) requirements using the provided pick lists. Alternatively, a shapefile, KML, or geodatabase for your geographic Area(s) of Interest may be provided.

My geographic area requirements are:

- ○ Nationwide, inland areas
- ○ One or more states, territories, or counties
- ○ One or more Hydrologic Units
- ○ Federally-owned lands nationwide, all lands of U.S. Tribes, or select large land holding agencies
- ○ None of the above; I will provide my own shapefile, KML, or geodatabase

***Question 24a. If your geographic area requirements for inland bathymetric data for your Mission Critical Activity are nationwide, please check the items below that best represent your nationwide requirements.**

- ☐ 48 conterminous states
- ☐ Alaska
- ☐ Hawai'i
- ☐ American Samoa
- ☐ Guam
- ☐ Northern Mariana Islands
- ☐ Federated States of Micronesia
- ☐ Palau
- ☐ Marshall Islands
- ☐ U.S. Minor Outlying Islands (Baker Island, Howland Island, Jarvis Island, Johnston Island, Kingman Reef, Midway Islands, Navassa Island, Palmyra Atoll, and Wake Island)
- ☐ Puerto Rico
- ☐ U.S. Virgin Islands
- ☐ All of the above

***Question 24b. If your geographic area requirements for inland bathymetric data for your Mission Critical Activity are for one or more states or counties, please check the state(s) below that are required. After you select the state(s) you will be allowed to identify sub-regions (counties) where 3D elevation data are required.**

☐ Alabama	☐ Louisiana	☐ Oklahoma
☐ Alaska	☐ Maine	☐ Oregon
☐ American Samoa	☐ Maryland	☐ Palau
☐ Arizona	☐ Marshall Islands	☐ Pennsylvania
☐ Arkansas	☐ Massachusetts	☐ Puerto Rico
☐ California	☐ Michigan	☐ Rhode Island
☐ Colorado	☐ Minnesota	☐ South Carolina
☐ Connecticut	☐ Mississippi	☐ South Dakota
☐ Delaware	☐ Missouri	☐ Tennessee
☐ Federated States of Micronesia	☐ Montana	☐ Texas
☐ Florida	☐ Nebraska	☐ U.S. Minor Outlying Islands
☐ Georgia	☐ Nevada	☐ U.S. Virgin Islands
☐ Guam	☐ New Hampshire	☐ Utah
☐ Hawai'i	☐ New Jersey	☐ Vermont
☐ Idaho	☐ New Mexico	☐ Virginia
☐ Illinois	☐ New York	☐ Washington
☐ Indiana	☐ North Carolina	☐ Washington, D.C.
☐ Iowa	☐ North Dakota	☐ West Virginia
☐ Kansas	☐ Northern Mariana Islands	☐ Wisconsin

- [ ] Kentucky
- [ ] Ohio
- [ ] Wyoming

Please be patient, this question can take up to 30 seconds to load.

Question 24b1. Do you have any sub-regions (counties or cities) where inland bathymetry information is required?

- ○ Yes
- ○ No

Question 24b2. Please list the sub-regions (counties or cities) where inland bathymetry information is required. Enter sub-region (county or city) first and then state (example: Fairfax County, VA or Chicago, IL).

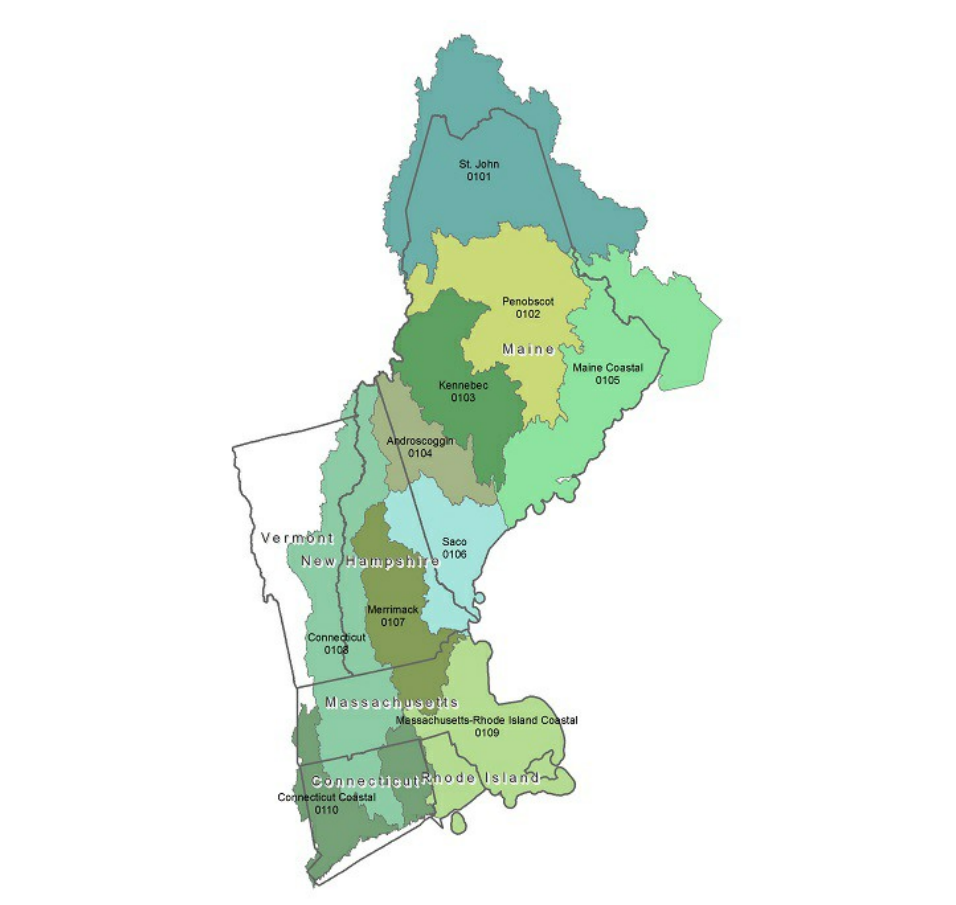
***Please be patient, this question can take up to 30 seconds to load.**

Question 24c. If your geographic area requirements for inland bathymetry pertain to hydrologic units (HUs), please check the appropriate hydrologic region(s) (2-digit HU) below. This will lead you to select individual 4-digit HUs nested within your hydrologic region. Please select all that are required.

- [ ] 01 New England
- [ ] 02 Mid-Atlantic
- [ ] 03 South Atlantic-Gulf
- [ ] 04 Great Lakes
- [ ] 05 Ohio
- [ ] 06 Tennessee
- [ ] 07 Upper Mississippi
- [ ] 08 Lower Mississippi
- [ ] 09 Souris-Red-Rainy
- [ ] 10 Missouri
- [ ] 11 Arkansas-White-Red
- [ ] 12 Texas – Gulf
- [ ] 13 Rio Grande
- [ ] 14 Upper Colorado
- [ ] 15 Lower Colorado
- [ ] 16 Great Basin
- [ ] 17 Pacific Northwest
- [ ] 18 California
- [ ] 19 Alaska
- [ ] 20 Hawai'i
- [ ] 21 Caribbean
- [ ] 22 Pacific Islands

Question 24c1. 01 New England

Please select individual HUC-4 codes for your specific hydrologic units.

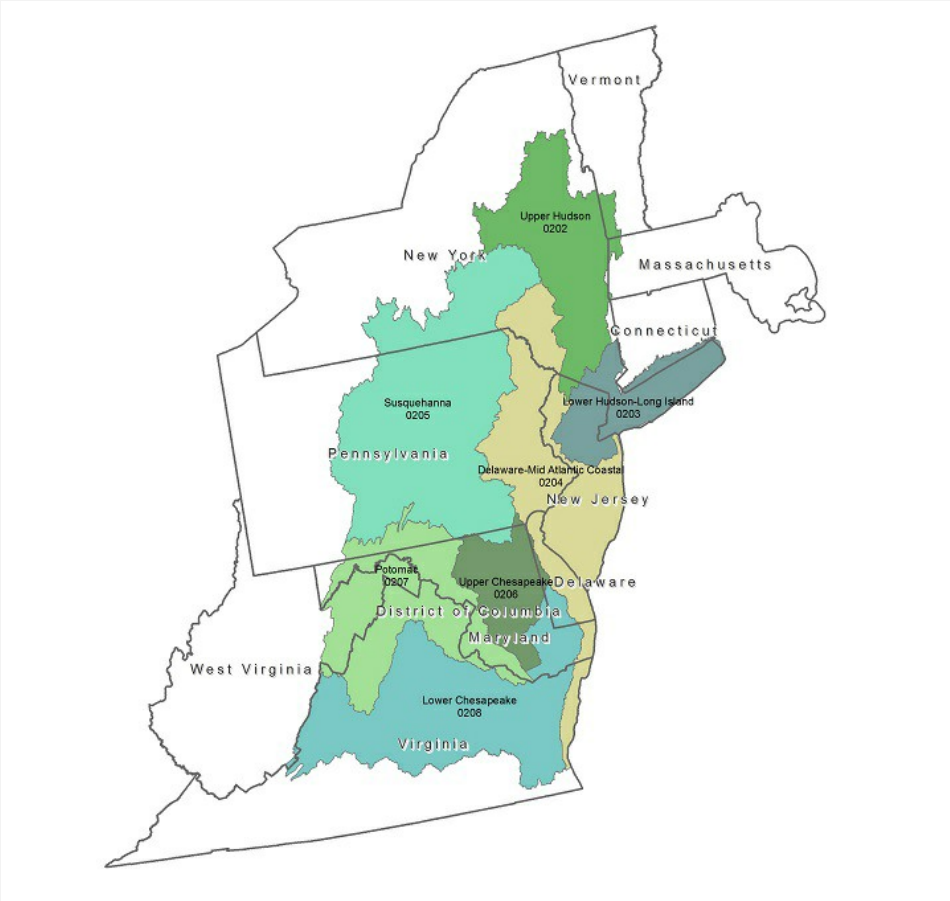


- [ ] 0101 - St. John
- [ ] 0102 - Penobscot
- [ ] 0107 - Merrimack
- [ ] 0108 - Connecticut

- [ ] 0103 - Kennebec
- [ ] 0104 - Androscoggin
- [ ] 0105 - Maine Coastal
- [ ] 0106 - Saco
- [ ] 0109 - Massachusetts-Rhode Island Coastal
- [ ] 0110 - Connecticut Coastal
- [ ] All codes

Question 24c2. 02 Mid-Atlantic

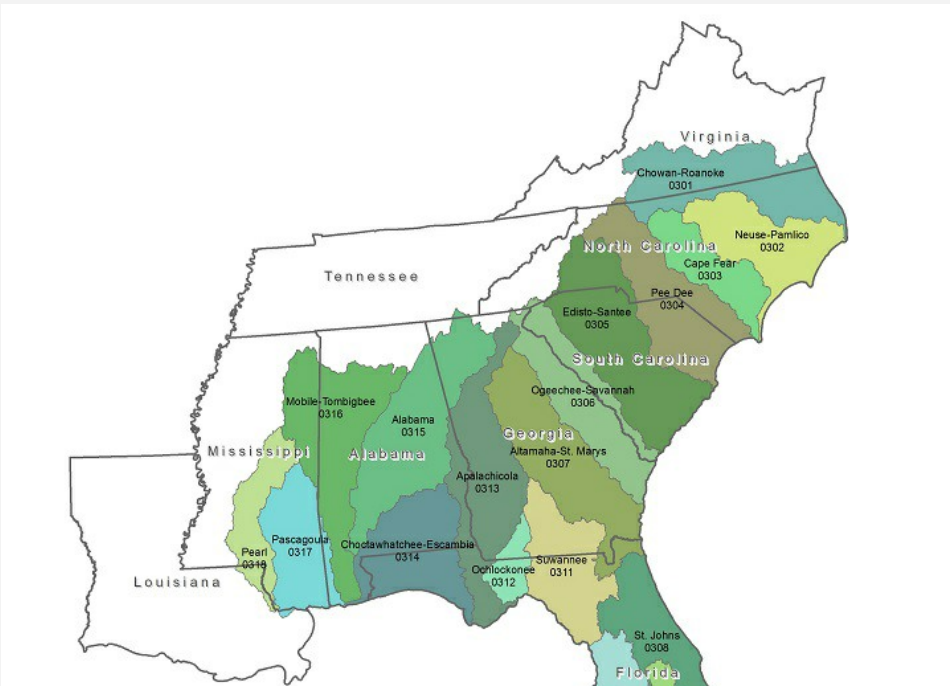
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0202 - Upper Hudson
- [ ] 0203 - Lower Hudson-Long Island
- [ ] 0204 - Delaware-Mid Atlantic Coastal
- [ ] 0205 - Susquehanna
- [ ] 0206 - Upper Chesapeake
- [ ] 0207 - Potomac
- [ ] 0208 - Lower Chesapeake
- [ ] All codes

Question 24c3. 03 South Atlantic-Gulf

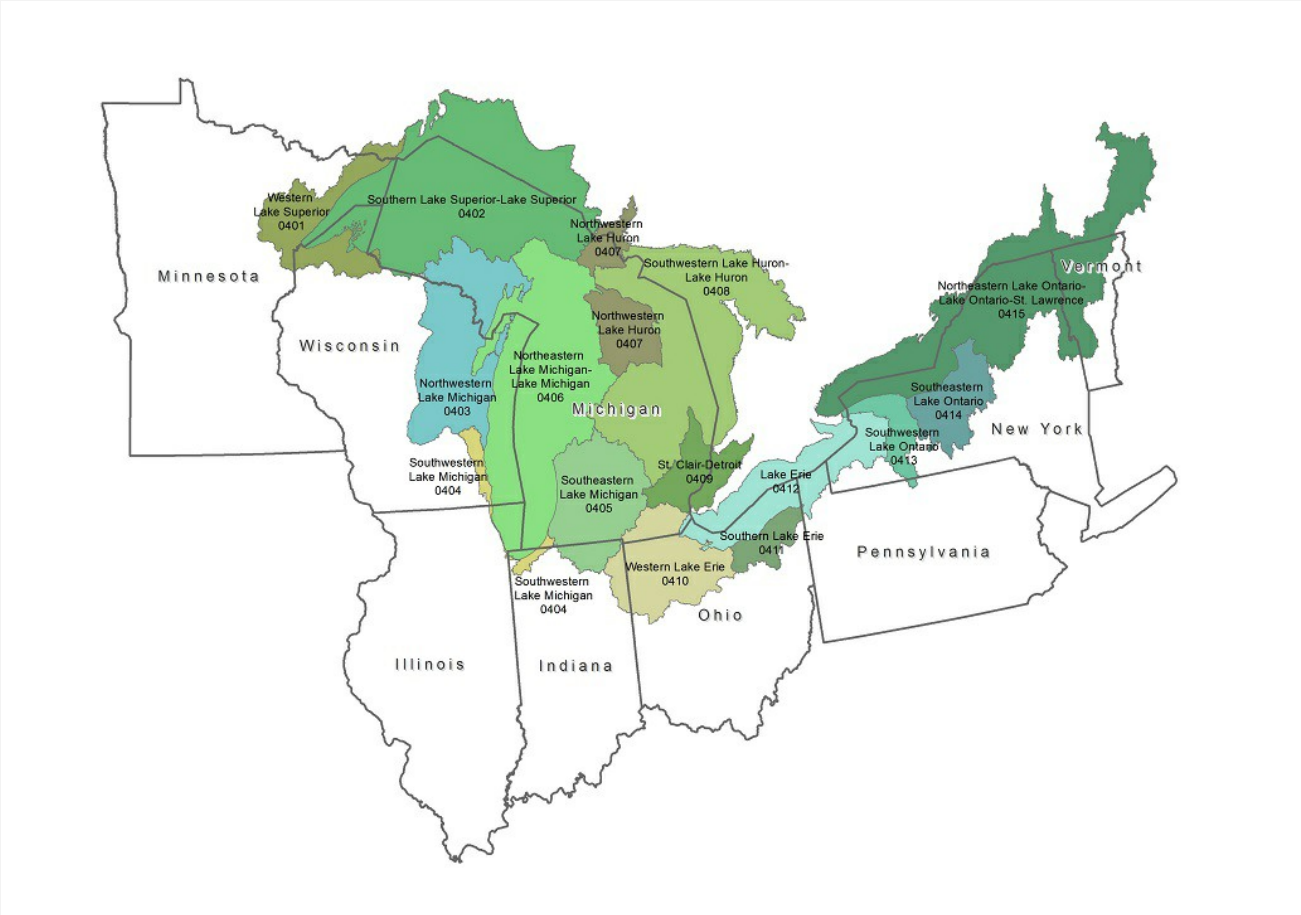
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0301 - Chowan-Roanoke
- [ ] 0302 - Neuse-Pamlico
- [ ] 0303 - Cape Fear
- [ ] 0304 - Pee Dee
- [ ] 0305 - Edisto-Santee
- [ ] 0306 - Ogeechee-Savannah
- [ ] 0307 - Altamaha-St. Marys
- [ ] 0308 - St. Johns
- [ ] 0309 - Southern Florida
- [ ] 0310 - Peace-Tampa Bay
- [ ] 0311 - Suwannee
- [ ] 0312 - Ochlockonee
- [ ] 0313 - Apalachicola
- [ ] 0314 - Choctawhatchee-Escambia
- [ ] 0315 - Alabama
- [ ] 0316 - Mobile-Tombigbee
- [ ] 0317 - Pascagoula
- [ ] 0318 - Pearl
- [ ] All codes

Question 24c4. 04 Great Lakes

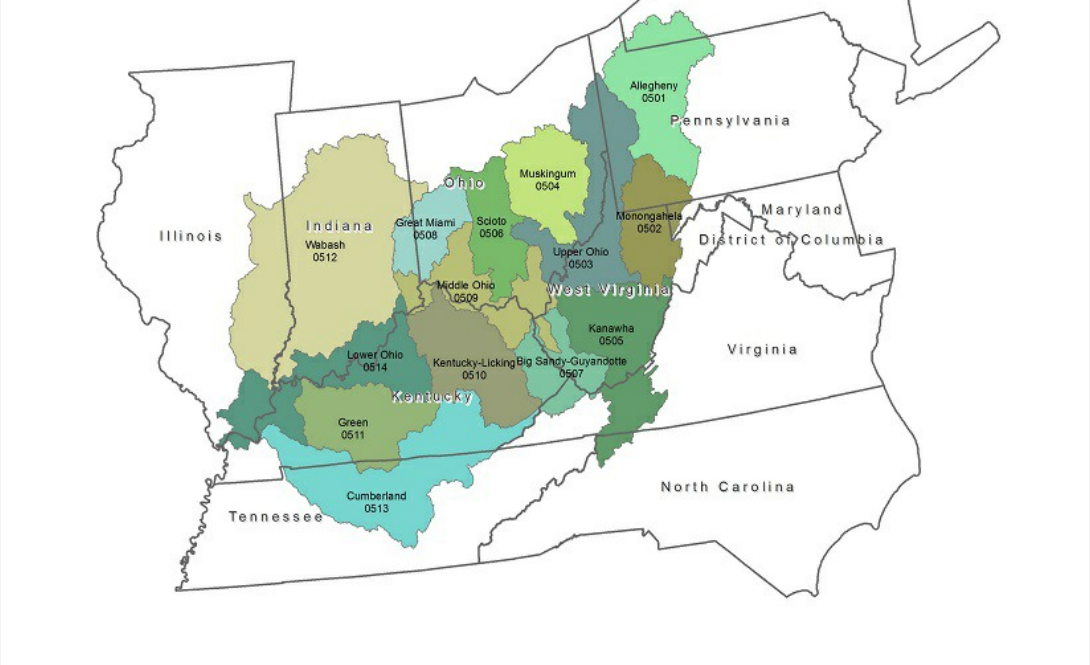
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0401 - Western Lake Superior
- [ ] 0402 - Southern Lake Superior-Lake Superior
- [ ] 0403 - Northwestern Lake Michigan
- [ ] 0404 - Southwestern Lake Michigan
- [ ] 0405 - Southeastern Lake Michigan
- [ ] 0406 - Northeastern Lake Michigan-Lake Michigan
- [ ] 0407 - Northwestern Lake Huron
- [ ] 0408 - Southwestern Lake Huron-Lake Huron
- [ ] 0409 - St. Clair-Detroit
- [ ] 0410 - Western Lake Erie
- [ ] 0411 - Southern Lake Erie
- [ ] 0412 - Lake Erie
- [ ] 0413 - Southwestern Lake Ontario
- [ ] 0414 - Southeastern Lake Ontario
- [ ] 0415 - Northeastern Lake Ontario-Lake Ontario-St. Lawrence
- [ ] All codes

Question 24c5. 05 Ohio

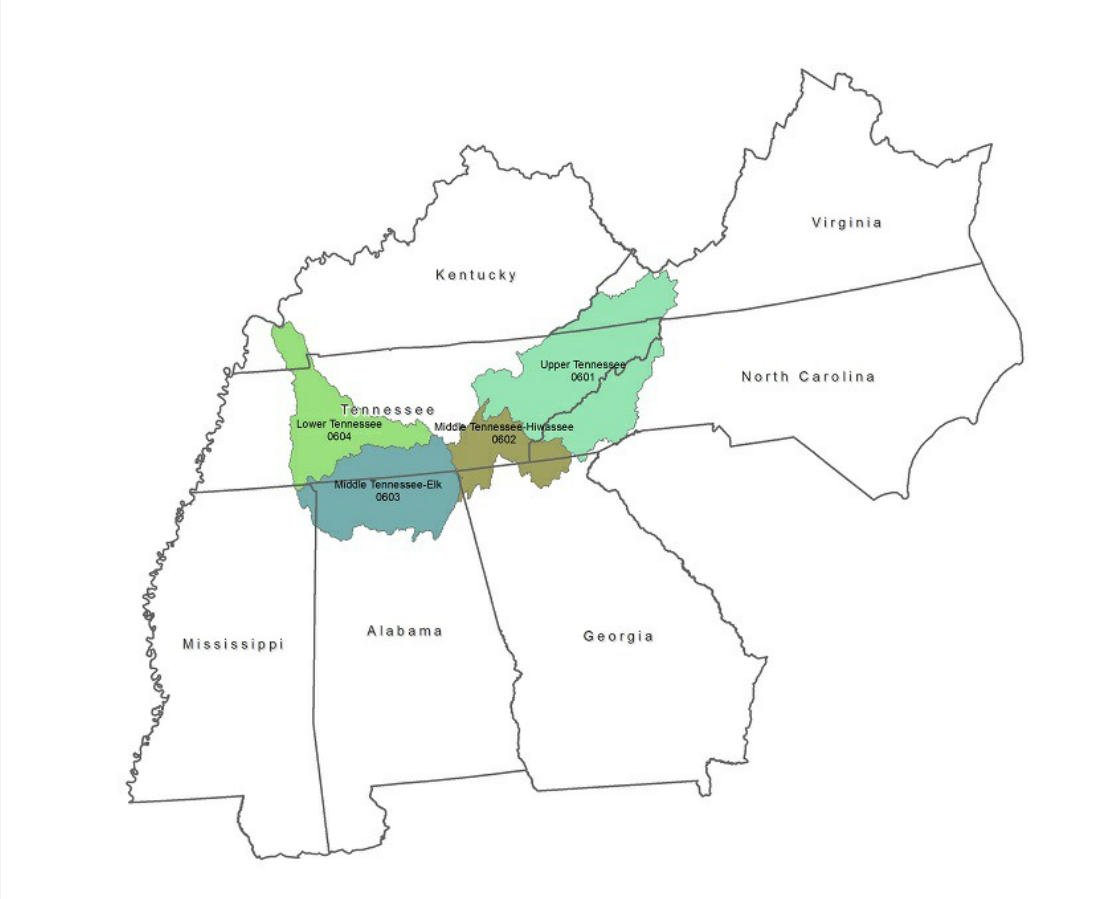
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0501 - Allegheny
- [ ] 0502 - Monongahela
- [ ] 0503 - Upper Ohio
- [ ] 0504 - Muskingum
- [ ] 0505 - Kanawha
- [ ] 0506 - Scioto
- [ ] 0507 - Big Sandy-Guyandotte
- [ ] 0508 - Great Miami
- [ ] 0509 - Middle Ohio
- [ ] 0510 - Kentucky-Licking
- [ ] 0511 - Green
- [ ] 0512 - Wabash
- [ ] 0513 - Cumberland
- [ ] 0514 - Lower Ohio
- [ ] All codes

Question 24c6. 06 Tennessee

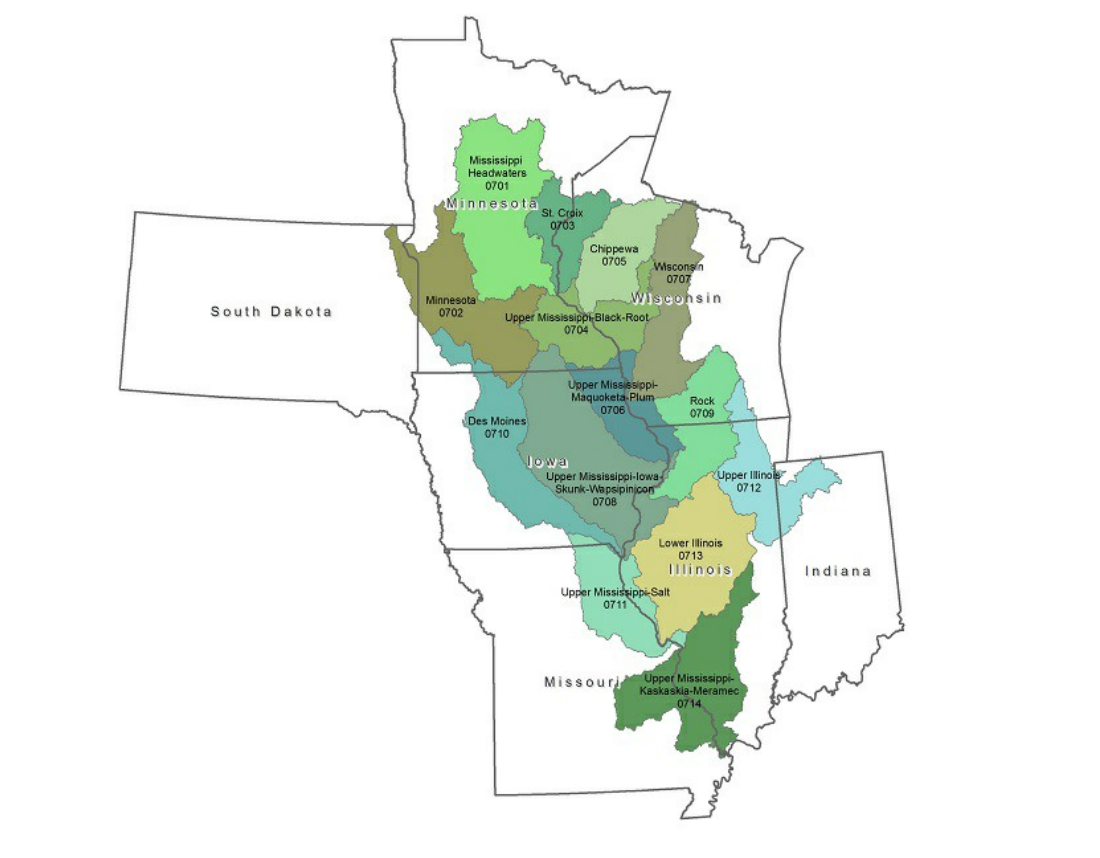
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0601 - Upper Tennessee
- [ ] 0602 - Middle Tennessee-Hiwassee
- [ ] 0603 - Middle Tennessee-Elk
- [ ] 0604 - Lower Tennessee
- [ ] All codes

Question 24c7. 07 Upper Mississippi

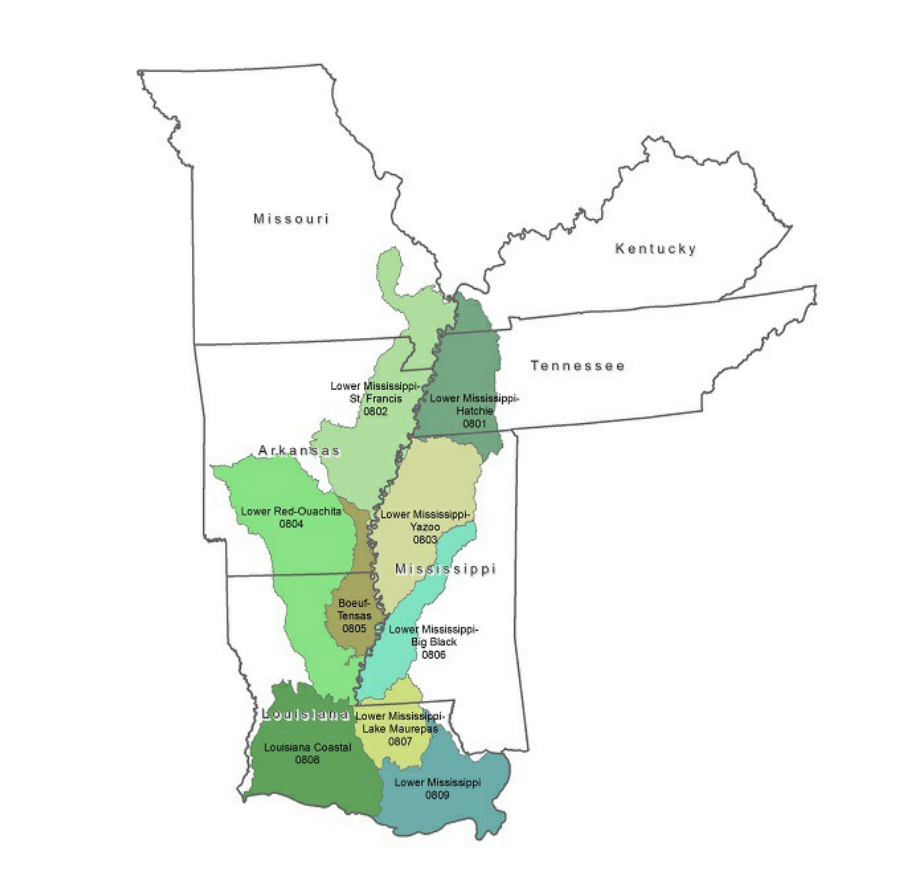
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0701 - Mississippi Headwaters
- [ ] 0702 - Minnesota
- [ ] 0703 - St. Croix
- [ ] 0704 - Upper Mississippi-Black-Root
- [ ] 0705 - Chippewa
- [ ] 0706 - Upper Mississippi-Maquoketa-Plum
- [ ] 0707 - Wisconsin
- [ ] 0708 - Upper Mississippi-Iowa-Skunk-Wapsipinicon
- [ ] 0709 - Rock
- [ ] 0710 - Des Moines
- [ ] 0711 - Upper Mississippi-Salt
- [ ] 0712 - Upper Illinois
- [ ] 0713 - Lower Illinois
- [ ] 0714 - Upper Mississippi-Kaskaskia-Meramec
- [ ] All codes

Question 24c8. 08 Lower Mississippi

Please select individual HUC-4 codes for your specific hydrologic units.

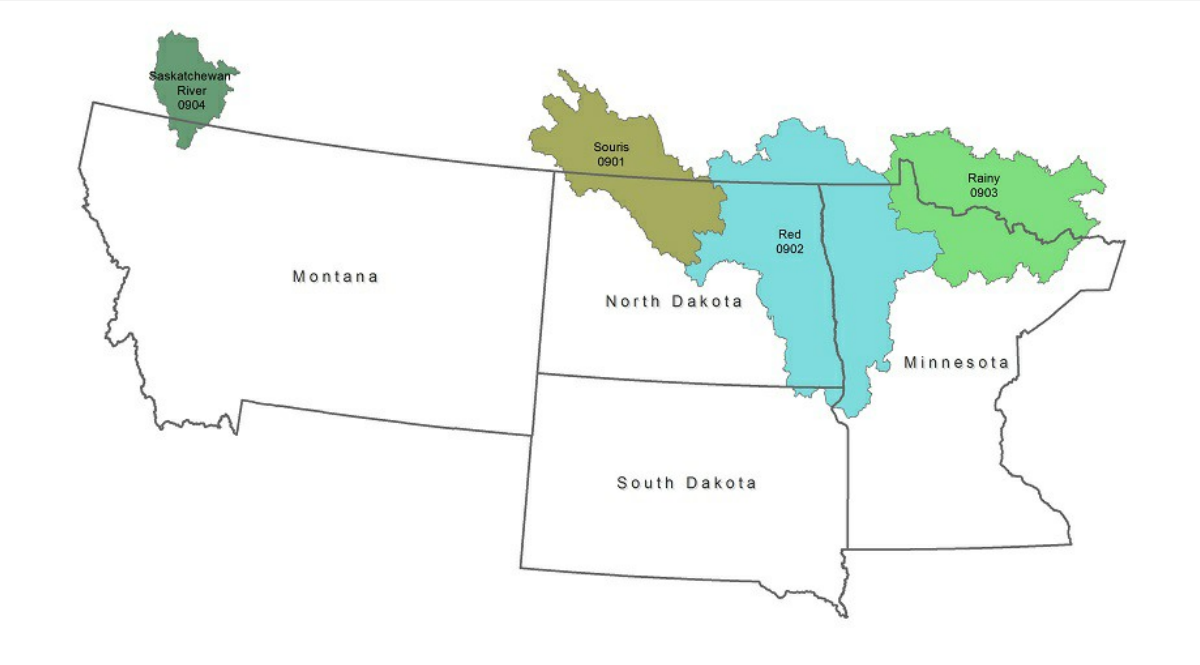


- [ ] 0801 - Lower Mississippi-Hatchie
- [ ] 0802 - Lower Mississippi-St. Francis
- [ ] 0803 - Lower Mississippi-Yazoo
- [ ] 0806 - Lower Mississippi-Big Black
- [ ] 0807 - Lower Mississippi-Lake Maurepas
- [ ] 0808 - Louisiana Coastal

- [ ] 0804 - Lower Red-Ouachita
- [ ] 0809 - Lower Mississippi
- [ ] 0805 - Boeuf-Tensas
- [ ] All codes

Question 24c9. 09 Souris-Red-Rainy

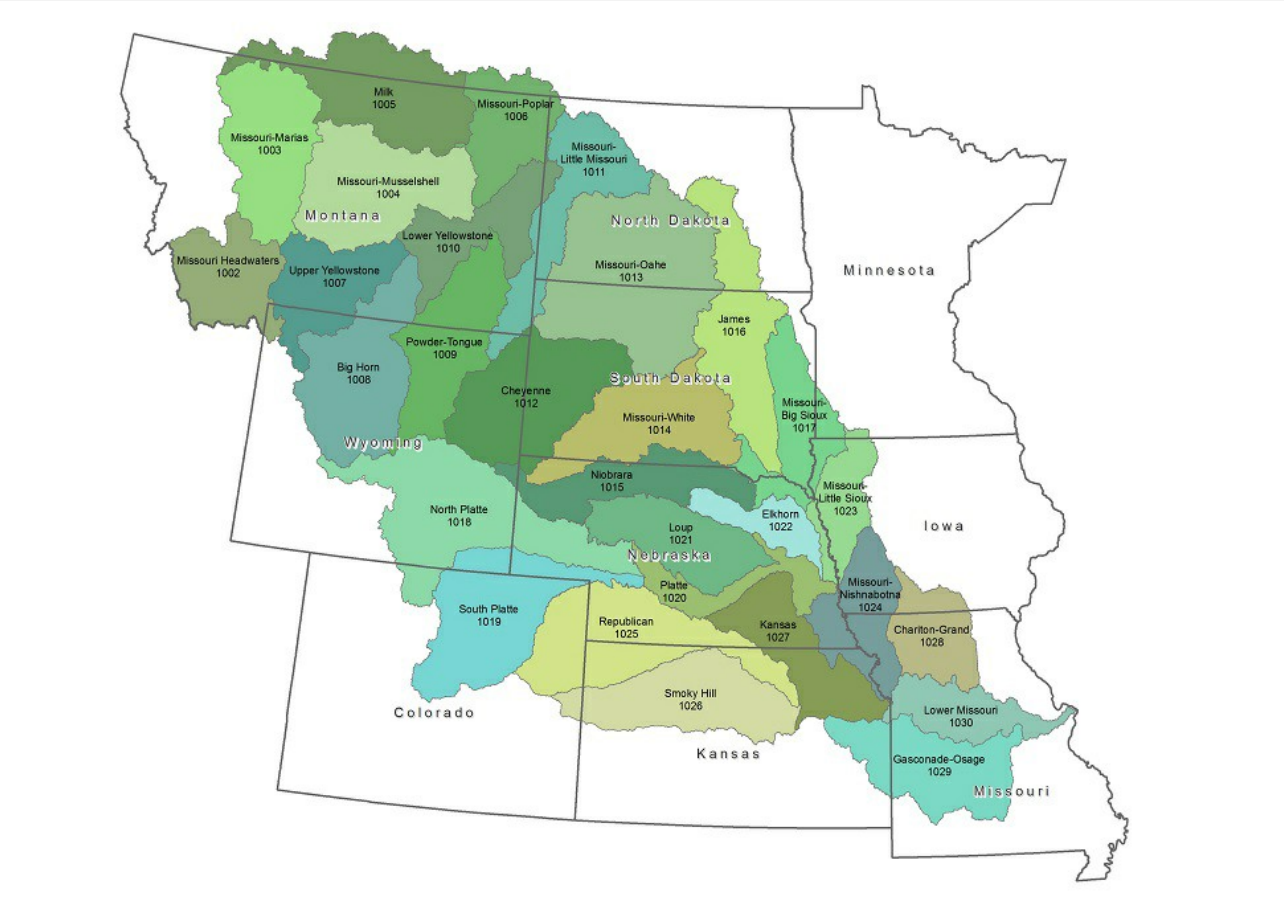
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0901 - Souris
- [ ] 0904 - Saskatchewan River
- [ ] 0902 - Red
- [ ] All codes
- [ ] 0903 - Rainy

Question 24c10. 10 Missouri

Please select individual HUC-4 codes for your specific hydrologic units.

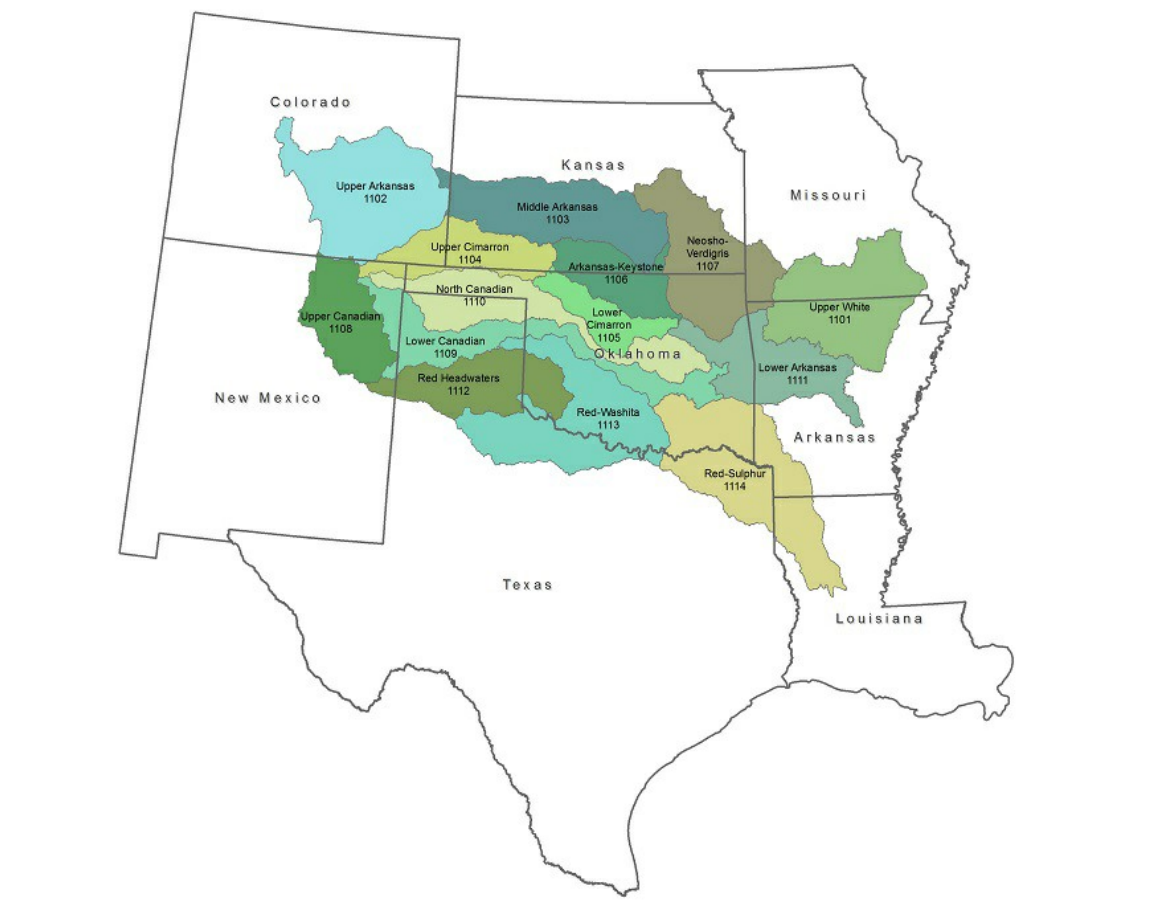


- [ ] 1002 - Missouri Headwaters
- [ ] 1012 - Cheyenne
- [ ] 1022 - Elkhorn
- [ ] 1003 - Missouri-Marias
- [ ] 1013 - Missouri-Oahe
- [ ] 1023 - Missouri-Little Sioux
- [ ] 1004 - Missouri-Musselshell
- [ ] 1014 - Missouri-White
- [ ] 1024 - Missouri-Nishnabotna

- [ ] 1005 - Milk
- [ ] 1006 - Missouri-Poplar
- [ ] 1007 - Upper Yellowstone
- [ ] 1008 - Big Horn
- [ ] 1009 - Powder-Tongue
- [ ] 1010 - Lower Yellowstone
- [ ] 1011 - Missouri-Little Missouri
- [ ] 1015 - Niobrara
- [ ] 1016 - James
- [ ] 1017 - Missouri-Big Sioux
- [ ] 1018 - North Platte
- [ ] 1019 - South Platte
- [ ] 1020 - Platte
- [ ] 1021 - Loup
- [ ] 1025 - Republican
- [ ] 1026 - Smoky Hill
- [ ] 1027 - Kansas
- [ ] 1028 - Chariton-Grand
- [ ] 1029 - Gasconade-Osage
- [ ] 1030 - Lower Missouri
- [ ] All codes

Question 24c11. 11 Arkansas-White-Red

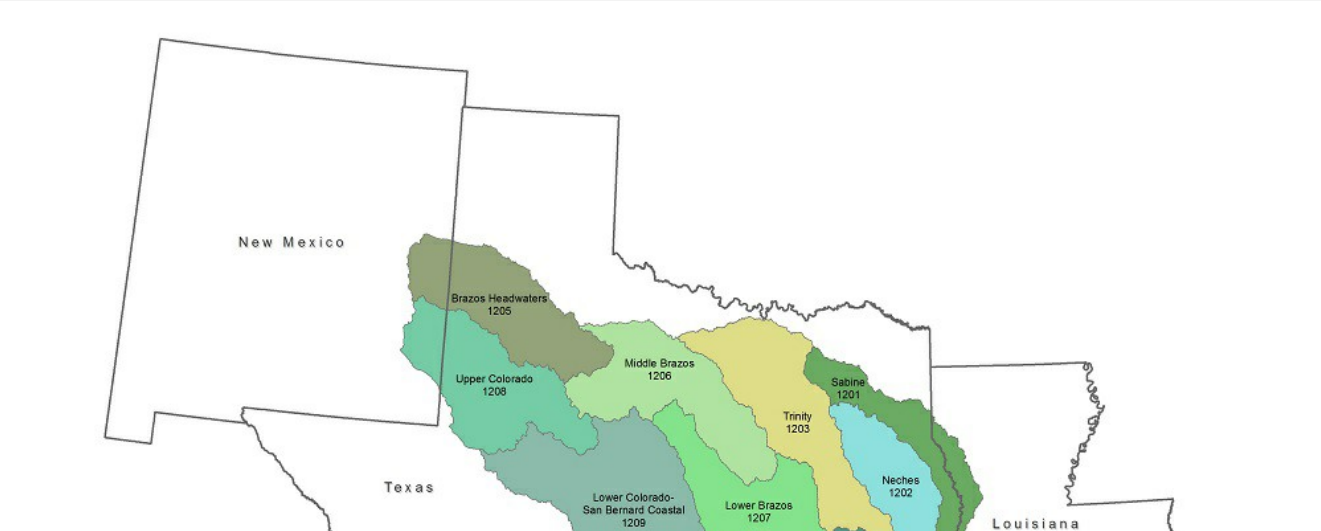
Please select individual HUC-4 codes for your specific hydrologic units.

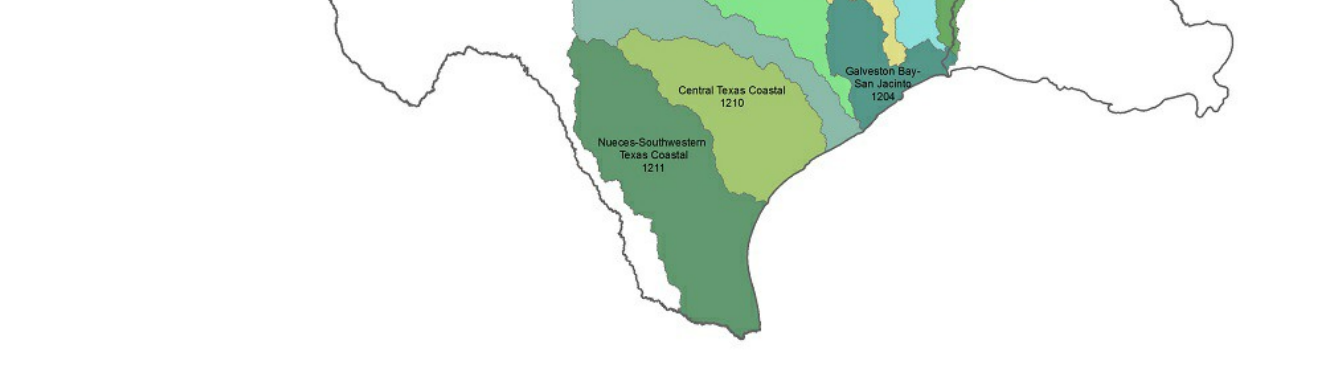


- [ ] 1101 - Upper White
- [ ] 1102 - Upper Arkansas
- [ ] 1103 - Middle Arkansas
- [ ] 1104 - Upper Cimarron
- [ ] 1105 - Lower Cimarron
- [ ] 1106 - Arkansas-Keystone
- [ ] 1107 - Neosho-Verdigris
- [ ] 1108 - Upper Canadian
- [ ] 1109 - Lower Canadian
- [ ] 1110 - North Canadian
- [ ] 1111 - Lower Arkansas
- [ ] 1112 - Red Headwaters
- [ ] 1113 - Red-Washita
- [ ] 1114 - Red-Sulphur
- [ ] All codes

Question 24c12. 12 Texas – Gulf

Please select individual HUC-4 codes for your specific hydrologic units.





- [ ] 1201 - Sabine
- [ ] 1202 - Neches
- [ ] 1203 - Trinity
- [ ] 1204 - Galveston Bay-San Jacinto
- [ ] 1205 - Brazos Headwaters
- [ ] 1206 - Middle Brazos
- [ ] 1207 - Lower Brazos
- [ ] 1208 - Upper Colorado
- [ ] 1209 - Lower Colorado-San Bernard Coastal
- [ ] 1210 - Central Texas Coastal
- [ ] 1211 - Nueces-Southwestern Texas Coastal
- [ ] All codes

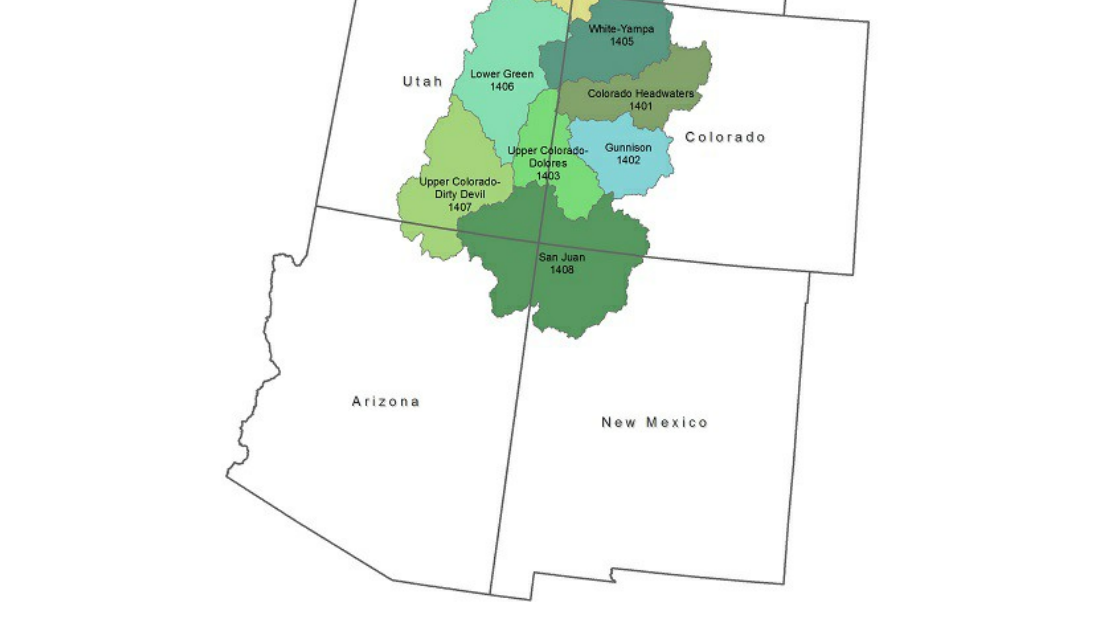
Question 24c13. 13 Rio Grande

Please select individual HUC-4 codes for your specific hydrologic units.

- [ ] 1301 - Rio Grande Headwaters
- [ ] 1302 - Rio Grande-Elephant Butte
- [ ] 1303 - Rio Grande-Mimbres
- [ ] 1304 - Rio Grande-Amistad
- [ ] 1305 - Rio Grande Closed Basins
- [ ] 1306 - Upper Pecos
- [ ] 1307 - Lower Pecos
- [ ] 1308 - Rio Grande-Falcon
- [ ] 1309 - Lower Rio Grande
- [ ] All codes

Question 24c14. 14 Upper Colorado

Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1401 - Colorado Headwaters
- [ ] 1402 - Gunnison
- [ ] 1403 - Upper Colorado-Dolores
- [ ] 1404 - Great Divide-Upper Green
- [ ] 1405 - White-Yampa
- [ ] 1406 - Lower Green
- [ ] 1407 - Upper Colorado-Dirty Devil
- [ ] 1408 - San Juan
- [ ] All codes

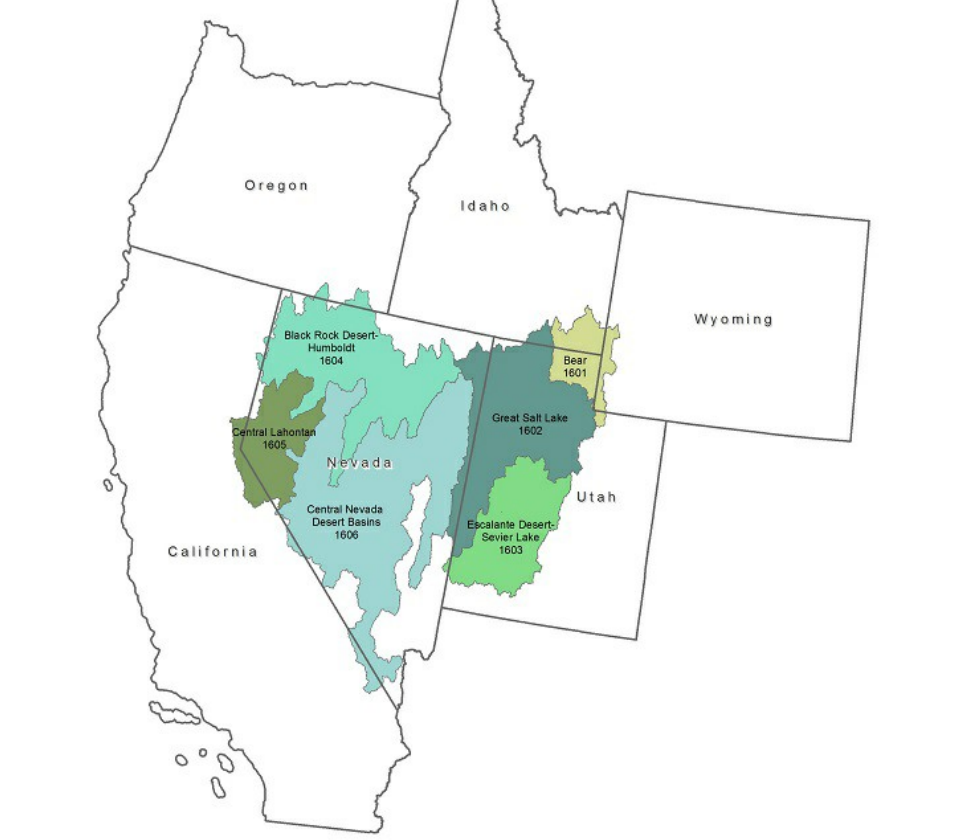
Question 24c15. 15 Lower Colorado

Please select individual HUC-4 codes for your specific hydrologic units.

- [ ] 1501 - Lower Colorado-Lake Mead
- [ ] 1502 - Little Colorado
- [ ] 1503 - Lower Colorado
- [ ] 1504 - Upper Gila
- [ ] 1505 - Middle Gila
- [ ] 1506 - Salt
- [ ] 1507 - Lower Gila
- [ ] 1508 - Sonora
- [ ] All codes

Question 24c16. 16 Great Basin

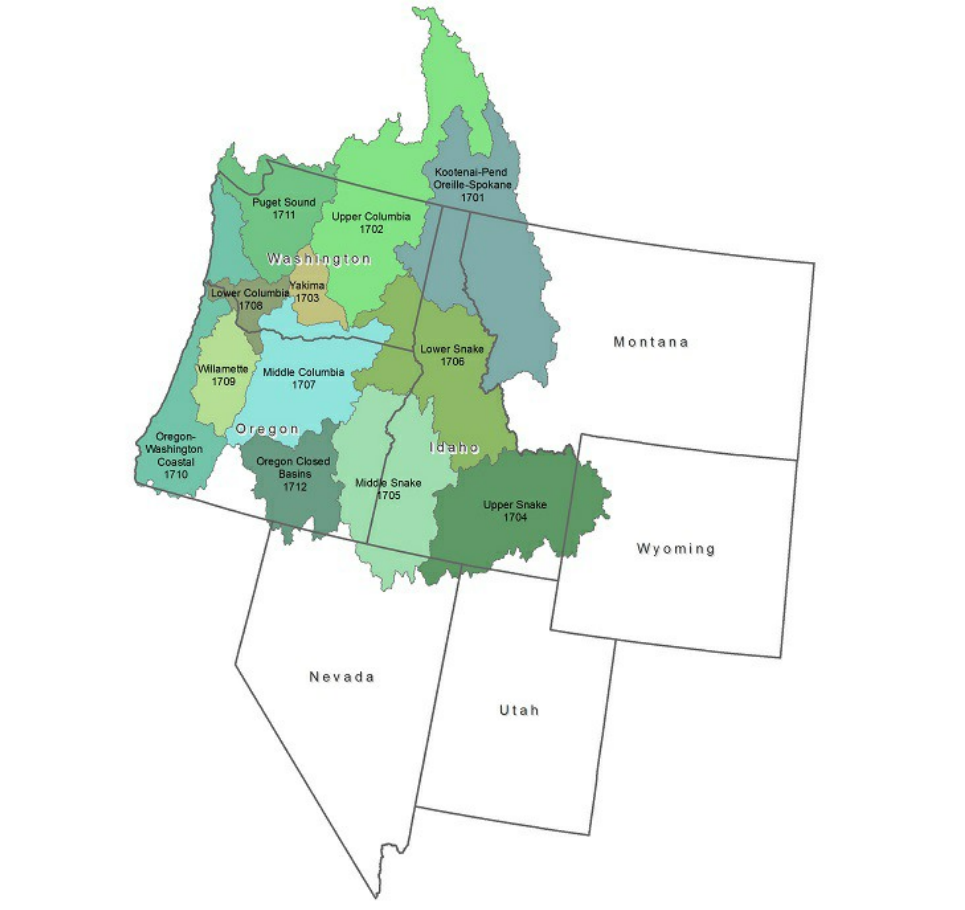
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1601 - Bear
- [ ] 1602 - Great Salt Lake
- [ ] 1603 - Escalante Desert-Sevier Lake
- [ ] 1604 - Black Rock Desert-Humboldt
- [ ] 1605 - Central Lahontan
- [ ] 1606 - Central Nevada Desert Basins
- [ ] All codes

Question 24c17. 17 Pacific Northwest

Please select individual HUC-4 codes for your specific hydrologic units.

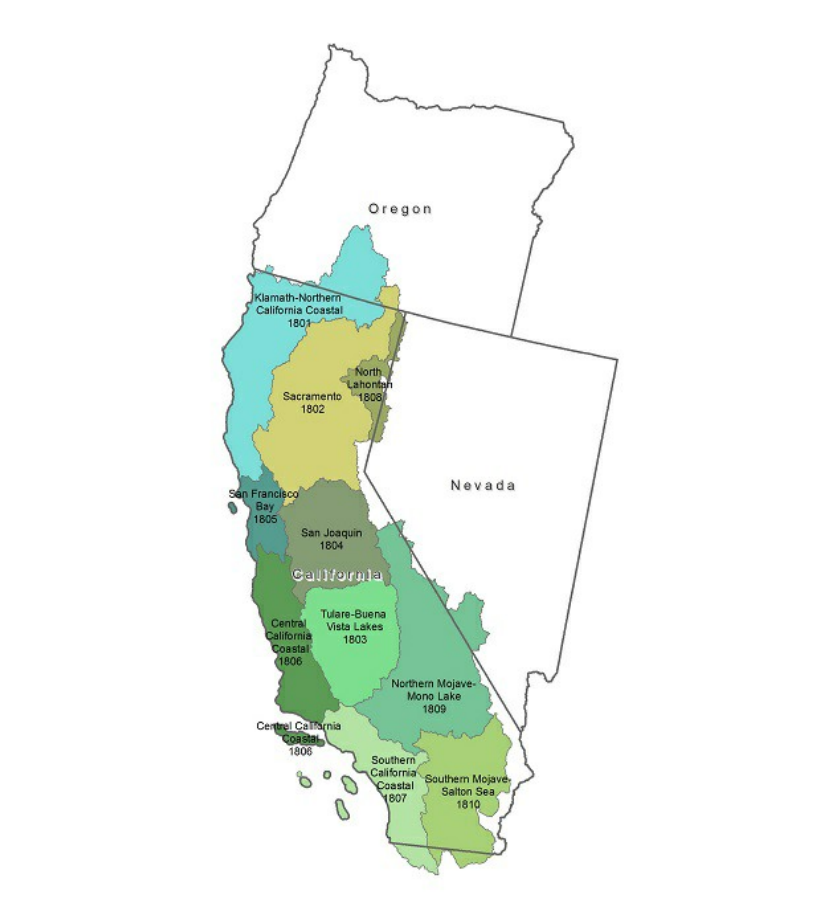


- [ ] 1701 - Kootenai-Pend Oreille-Spokane
- [ ] 1702 - Upper Columbia
- [ ] 1703 - Yakima
- [ ] 1704 - Upper Snake
- [ ] 1708 - Lower Columbia
- [ ] 1709 - Willamette
- [ ] 1710 - Oregon-Washington Coastal
- [ ] 1711 - Puget Sound

- [ ] 1705 - Middle Snake
- [ ] 1706 - Lower Snake
- [ ] 1707 - Middle Columbia
- [ ] 1712 - Oregon Closed Basins
- [ ] All codes

Question 24c18. 18 California

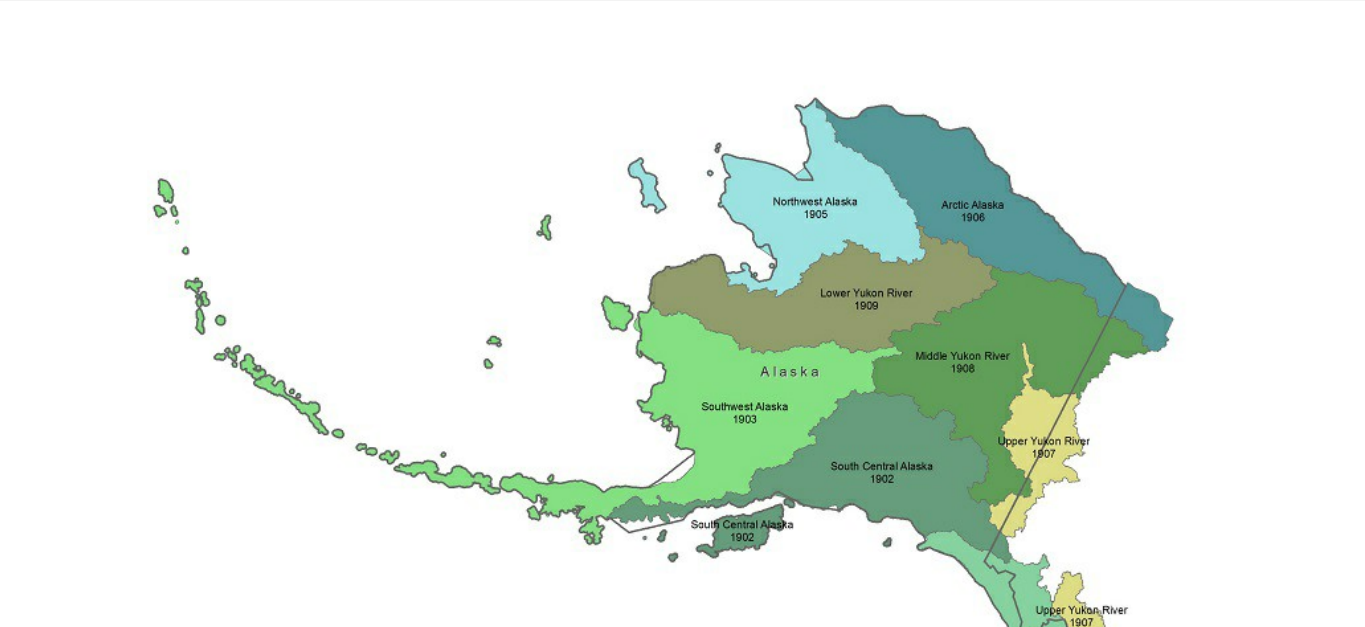
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1801 - Klamath-Northern California Coastal
- [ ] 1802 - Sacramento
- [ ] 1803 - Tulare-Buena Vista Lakes
- [ ] 1804 - San Joaquin
- [ ] 1805 - San Francisco Bay
- [ ] 1806 - Central California Coastal
- [ ] 1807 - Southern California Coastal
- [ ] 1808 - North Lahontan
- [ ] 1809 - Northern Mojave-Mono Lake
- [ ] 1810 - Southern Mojave-Salton Sea
- [ ] All codes

Question 24c19. 19 Alaska

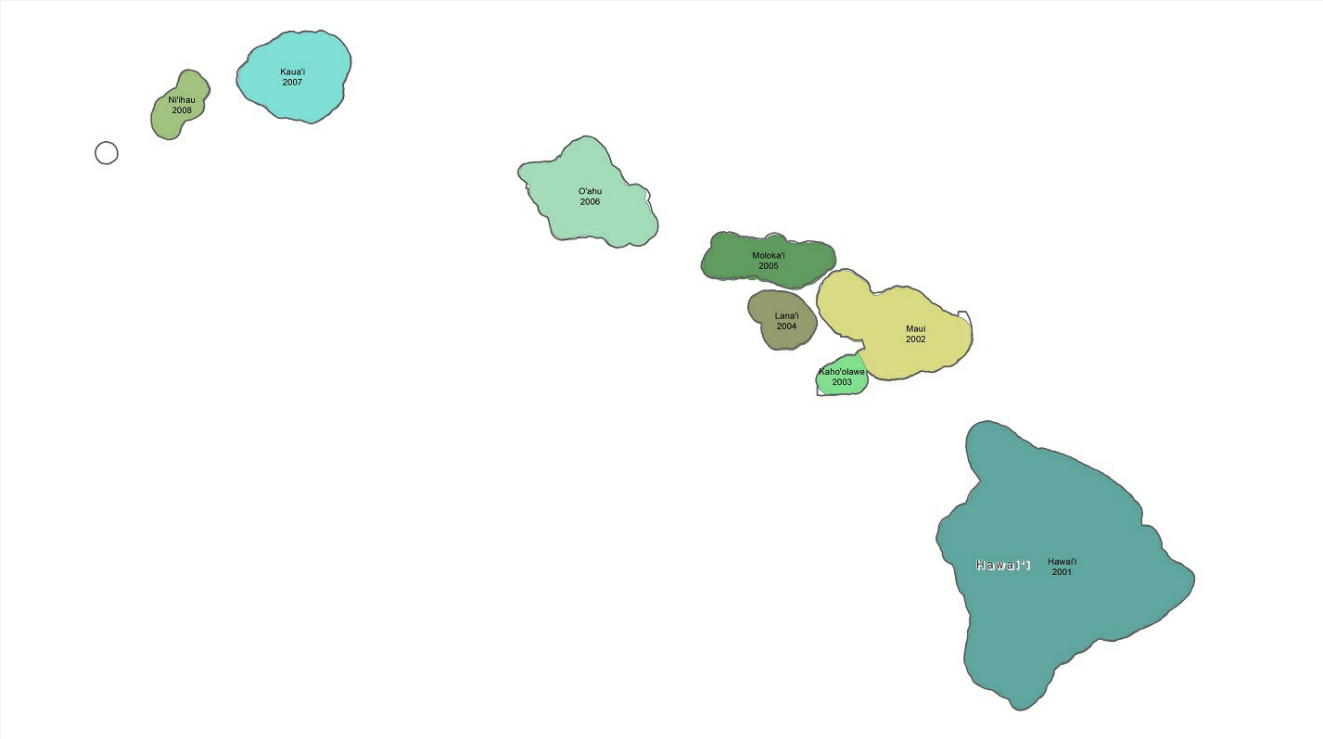
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1901 - Southeast Alaska
- [ ] 1905 - Northwest Alaska
- [ ] 1908 - Middle Yukon River
- [ ] 1902 - South Central Alaska
- [ ] 1906 - Arctic Alaska
- [ ] 1909 - Lower Yukon River
- [ ] 1903 - Southwest Alaska
- [ ] 1907 - Upper Yukon River
- [ ] All codes

Question 24c20. 20 Hawai'i

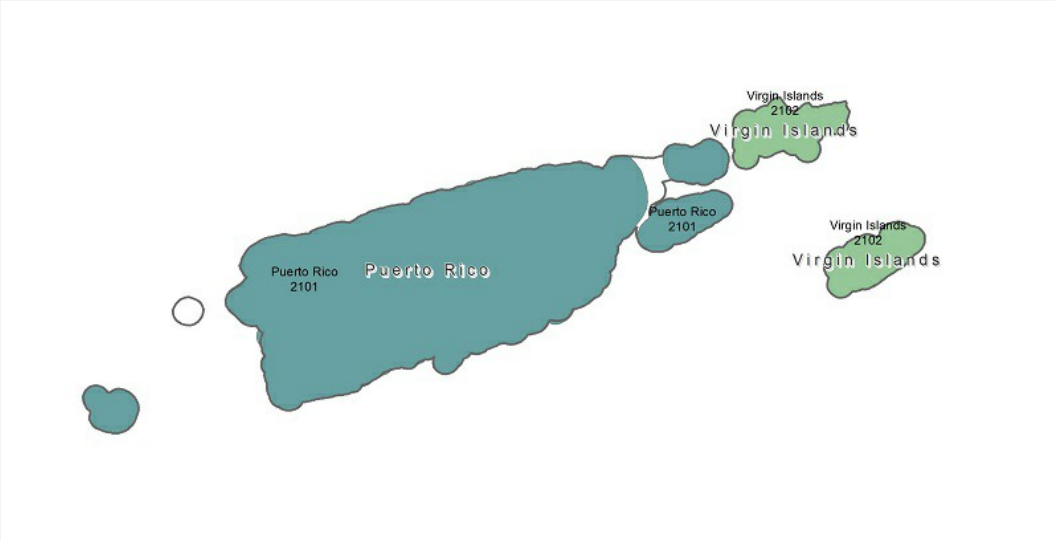
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 2001 - Hawai'i
- [ ] 2004 - Lana'i
- [ ] 2007 - Kaua'i
- [ ] 2002 - Maui
- [ ] 2005 - Moloka'i
- [ ] 2008 - Ni'ihau
- [ ] 2003 - Kaho'olawe
- [ ] 2006 - O'ahu
- [ ] All codes

Question 24c21. 21 Caribbean

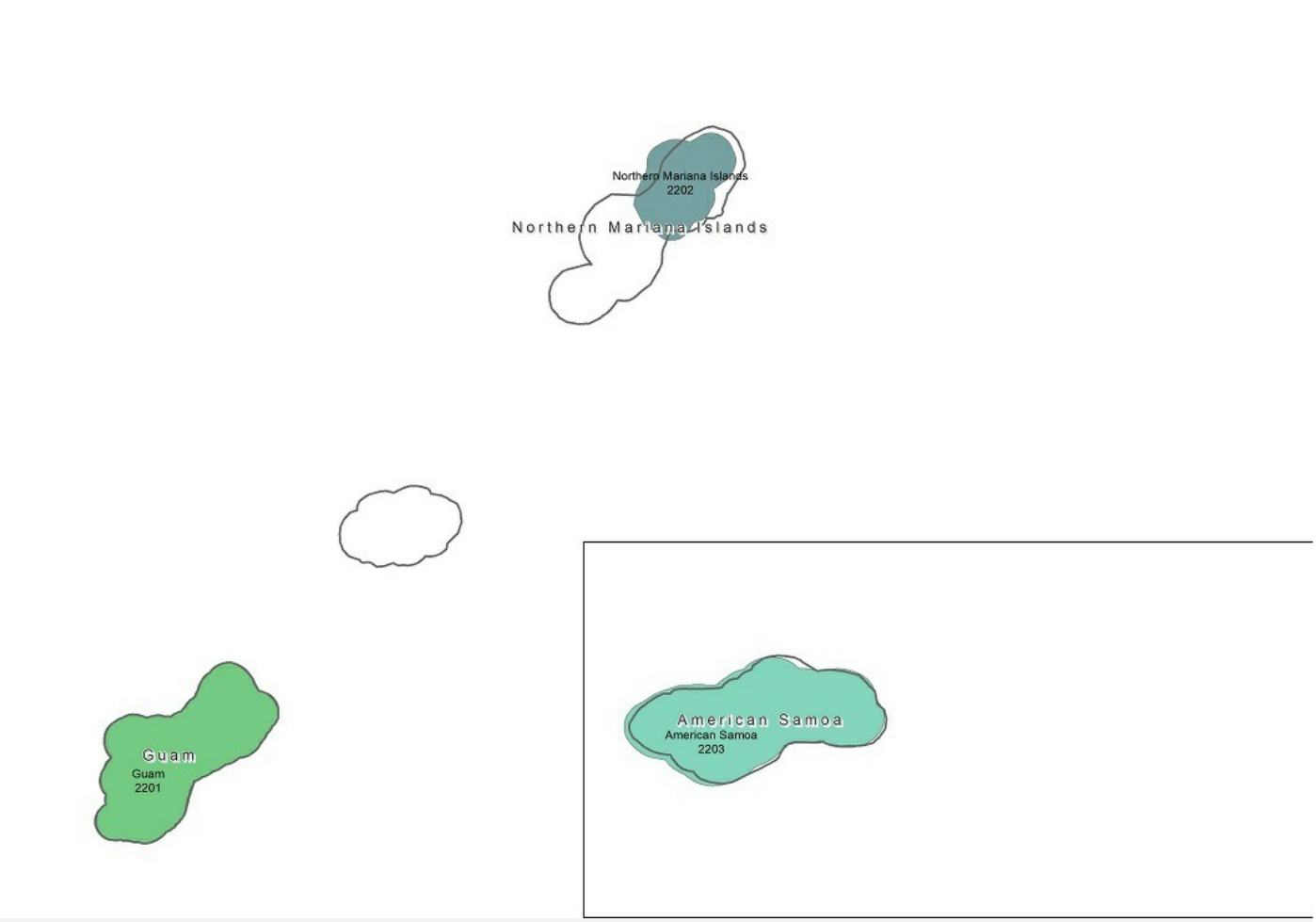
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 2101 - Puerto Rico
- [ ] 2102 - Virgin Islands
- [ ] All codes

Question 24c22. 22 Pacific Islands

Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 2201 - Guam
- [ ] 2203 - American Samoa
- [ ] 2202 - Northern Mariana Islands
- [ ] All codes

***Question 24d. If your geographic area requirements for inland bathymetry pertain to Federally-owned or Tribal lands, please designate below. Please select all that are required.**

- [ ] All Federally owned lands
- [ ] American Indian reservations, off-reservation trust lands, Alaska Native areas, and Hawaiian home lands
- [ ] Bureau of Land Management (BLM)
- [ ] Bureau of Reclamation
- [ ] Department of Defense (DOD)
- [ ] National Park Service (NPS)
- [ ] Tennessee Valley Authority (TVA)
- [ ] U.S. Forest Service (USFS)
- [ ] U.S. Fish and Wildlife Service (USFWS)
- [ ] Other (enter name and/or description):

***Question 24e. If applicable, please submit your geographic area requirements for inland bathymetry by emailing your shapefile(s), KML, or geodatabase to the project team at 3DNationStudy@usgs.gov and provide a unique filename that includes your organization and Mission Critical Activity, or abbreviations thereof (e.g., MN_DNR_stormwater_mgt or EPA_eBeaches). The projection and datum (.prj file) information must be included. Please enter the filename below. See FAQ #6.**

***Question 25a. For the Mission Critical Activity that you specified, please describe the importance of inland bathymetry for the specified feature size. For each feature size, please identify *how important* it is that inland bathymetry is available: See FAQ #20.**

Importance rating: Required; Highly desirable; Nice to have; Not required

	Required	Highly desirable	Nice to have	Not required
Navigable channels (as defined by USACE)				
Feature Size: Rivers and Streams (Measured by width)				
Less than 10 ft				
10 - 50 ft				

51 - 100 ft				
101 - 500 ft				
501 - 2,500 ft				
Greater than 2,500 ft				
Feature Size: Waterbodies (Reservoirs, lakes, ponds) (Measured by surface area)				
Less than ½ acre				
½ - 1 acre				
1.1 - 2 acres				
2.1 - 5 acres				
5.1 - 10 acres				
Greater than 10 acres				

Question 25b. Is there a different feature size for which you require inland bathymetry? If so, please list the size and identify how important it is that inland bathymetry is available.

	Required	Highly desirable	Nice to have	Not required
Feature Size: Rivers and Streams (Measured by width)				
Other (please describe):				
Feature Size: Waterbodies (Reservoirs, lakes, ponds) (Measured by surface area)				
Other (please describe):				

Question 26. What amount of horizontal error is acceptable in your inland bathymetric data? In other words, what is the needed Total Horizontal Uncertainty (THU) of your inland 3D bathymetric data at the 95% confidence level? Check one. See FAQ #21 for background information.

- Less than 50 cm
- Up to 1 meter
- Up to 2 meters
- Up to 5 meters
- Up to 10 meters
- Up to 20 meters
- Greater than 20 meters
- The best horizontal accuracy achievable for the vertical accuracy I need
- I don't know

Question 27. What amount of vertical error is acceptable in your inland 3D bathymetric data? In other words, what is the needed Total Vertical Uncertainty (TVU) of your inland 3D bathymetric data at the 95% confidence level? Check one. See FAQ #22 for background information.

- Less than 10 cm
- Up to 20 cm
- Up to 30 cm
- Up to 40 cm
- Up to 50 cm
- Up to 60 cm
- Up to 80 cm
- Up to 1 meter
- Greater than 1 meter
- I don't know

Please be patient, this question can take up to 30 seconds to load.

Question 28a. For the inland bathymetric portion of your Mission Critical Activity, do cross sections and/or transects meet your requirements for bathymetric data? Please select one. See FAQ #10.

- Yes, for the entire Area of Interest for my Mission Critical Activity
- Yes, for part of my Area of Interest
- No, I need full bottom coverage of inland bathymetric data

Question 28b. Please specify the vertical accuracy and longitudinal sampling density required for the cross sections/transects. If your cross section/transect requirement is for a portion of the Area of Interest for your Mission Critical Activity, please also describe where you require cross sections/transects.

*Question 28c. What bathymetric or topobathymetric Quality Level (QL_B) do you require for the inland bathymetry portion of your Mission Critical Activity? Check one QL_B only, chosen from the table below. Note that the vertical accuracy specification for $QL0_B$ and $QL1_B$ is equivalent to the International Hydrographic Organization (IHO) Special Order standard, and the vertical accuracy specification for $QL4_B$ is equivalent to the IHO Order 1 standard for vertical accuracy. See FAQ #23.

	$QL0_B$	$QL1_B$	$QL2_B$	$QL3_B$	$QL4_B$
	IHO Special Order				IHO Order 1
Aggregate Nominal Pulse Spacing	≤0.7m	≤2.0 m	≤0.7m	≤2.0 m	≤5.0 m
Aggregate Nominal Pulse Density	≥2.0 pts/m²	≥0.25 pts/m²	≥2.0 pts/m²	≥0.25 pts/m²	≥0.04 pts/m²
Total Vertical Uncertainty (TVU)[1] (95% Confidence Level)	a = 0.25m b = 0.0075	a = 0.25m b = 0.0075	a = 0.30m b = 0.0130	a = 0.30m b = 0.0130	a = 0.5m b = 0.013
Depth Examples (m)	Depth Accuracy at 95% Confidence Level (cm)				
0	25.0	25.0	30.0	30.0	50.0
10	26.1	26.1	32.7	32.7	51.7
20	29.2	29.2	39.7	39.7	56.4
Example Applications	Detailed site surveys requiring the highest accuracy and highest resolution seafloor definition; dredging and inshore engineering surveys; high-resolution surveys of ports and harbors		Charting surveys; regional sediment management; general bathymetric mapping; coastal science and management applications; change analysis; deep water surveys; environmental analyses		Recon/planning; all general applications not requiring higher resolution and accuracy

[1] The formula below is to be used to compute, at the 95% confidence level, the maximum allowable TVU. The parameters "a" and "b" for each Order, together with the depth "d" are used to calculate the maximum allowable TVU for a specific depth:

Where: $\pm\sqrt{a^2 + (b \times d)^2}$

a represents that portion of the uncertainty that does not vary with depth

b is a coefficient which represents that portion of the uncertainty that varies with depth

d is the depth

b x d represents that portion of the uncertainty that varies with depth

- ○ QL0B
- ○ QL1B
- ○ QL2B
- ○ QL3B
- ○ QL4B
- ○ Coarser bathymetric data satisfies my needs
- ○ I don't know
- ○ I need higher quality data. Please describe:

*Question 29. For the inland bathymetry portion of your Mission Critical Activity, how frequently do the inland 3D bathymetry data need to be updated to satisfy your requirements? Stated another way, your Mission Critical Activity requires data no older than:_____. Please select one. See FAQ #12.

- ○ Annually (one year)
- ○ 2-3 years
- ○ 4-5 years
- ○ 6-10 years
- ○ >10 years

- ◯ Event driven only – Data need to coincide with a specific event
- ◯ Other (please specify):

Question 30a. For the Mission Critical Activity that you specified, please describe the importance of seamless integration within the inland bathymetric data for your Area of Interest (AOI). For each type of data integration, identify how important it is that data are integrated across/between the different inland bathymetry data collects that are often required to obtain inland bathymetric data for an entire AOI. Examples of data integration would be data collected at the same time (temporal integration) or data that spatially align between adjacent geographic areas (spatial integration). See FAQ #14.

Importance rating: Required; Highly desirable; Nice to have; Not required

	Seamless integration between inland bathymetric data collections across your Area of Interest			
	Required	Highly desirable	Nice to have	Not required
Temporal Integration				
Entire AOI needs to be collected in the same acquisition season/window (e.g. Fall 2018), regardless of environmental conditions	◯	◯	◯	◯
Entire AOI needs to be collected under similar environmental conditions (e.g., similar low streamflow conditions, turbidity, other weather conditions, etc.)	◯	◯	◯	◯
Other (please describe an	◯	◯	◯	◯
Spatial Integration				
Point Cloud or backscatter for entire AOI needs to be seamless (e.g., no obvious cliffs or voids where datasets join)	◯	◯	◯	◯
Digital Terrain/Elevation Model for entire AOI needs to be seamless (e.g., no cliffs or voids where datasets join)	◯	◯	◯	◯
Other (please describe an	◯	◯	◯	◯

Question 30b. If you indicated you wanted seamless spatial integration of your inland bathymetric data for your Area of Interest, what level of vertical manipulation are you willing to accept to achieve seamlessness? Check one. See FAQ #15 for background information.

- ◯ Up to the required Total Vertical Uncertainty (TVU) at the 95% confidence level
- ◯ Up to double the required TVU at the 95% confidence level
- ◯ Up to triple the required TVU at the 95% confidence level
- ◯ Whatever it takes to achieve seamlessness, including changes to the older, previously accepted dataset if it is proven to be less accurate than the newer
- ◯ I don't know
- ◯ Other (please describe):

Question 31a. For the Mission Critical Activity that you specified, please describe the importance of having inland bathymetric data seamlessly integrated with inland topographic data. Check one.

- ◯ Required
- ◯ Highly desirable
- ◯ Nice to have
- ◯ Not required

Question 31b. For the Mission Critical Activity that you specified, please describe the importance of seamless integration between the inland bathymetric data and the topographic data for your Area of Interest (AOI). For each type of data integration, identify how important it is that data are integrated between inland bathymetric and topographic data collections within your AOI. Examples of data integration would be data collected at the same time (temporal integration) or data that spatially align between adjacent geographic areas (spatial integration). See FAQ #14.

Importance rating: Required; Highly desirable; Nice to have; Not required

	Seamless integration between inland bathymetric and topographic data collections across your Area of Interest			
	Required	Highly desirable	Nice to have	Not required
Temporal Integration				
Entire AOI needs to be collected in the same acquisition season/window (e.g., Fall 2018), regardless of environmental conditions	◯	◯	◯	◯
Entire AOI needs to be collected under similar environmental conditions (e.g., similar low streamflow conditions, turbidity, other weather conditions, leaf off, leaf on, etc.)	◯	◯	◯	◯
Other (please describe an	◯	◯	◯	◯
Spatial Integration				
Point Cloud or backscatter for entire AOI needs to be seamless (e.g., no obvious cliffs or voids where datasets join)	◯	◯	◯	◯
Digital Terrain/Elevation Model for entire AOI needs to be seamless (e.g., no cliffs or voids where datasets join)	◯	◯	◯	◯
Other (please describe an	◯	◯	◯	◯

Question 31c. If you indicated you wanted seamless spatial integration of your inland bathymetric data with inland topographic data, what level of vertical manipulation are you willing to accept to achieve seamlessness? Check one. See FAQ #15 for background information.

- ◯ Up to the required Total Vertical Uncertainty (TVU) at the 95% confidence level

- Up to double the required TVU at the 95% confidence level
- Up to triple the required TVU at the 95% confidence level
- Whatever it takes to achieve seamlessness, including changes to the older, previously accepted dataset if it is proven to be less accurate than the newer dataset
- I don't know
- Other (please describe):

Question 32. For the Mission Critical Activity that you specified, please describe the importance of the following inland 3D bathymetric data products. For each data product, identify *how important* the 3D inland bathymetric data product is to your Mission Critical Activity. See FAQ #24.

Importance rating: Required; Highly desirable; Nice to have; Not required

	Required	Highly desirable	Nice to have	Not required
Data Products				
Digital Surface Model (DSM)				
Digital Terrain Model (DTM)				
Digital Elevation Model (DEM)				
Raw point cloud data				
Classified point cloud data (LAS classes)				
Edited/cube XYZ				
Full waveform				
Bathymetric Attributed Grid (BAG)				
Breaklines required for standard hydro-flattening				
Intensity imagery/sidescan imagery				
Ground control/ground truthing				
Other (please describe an				

Question 33. For the Mission Critical Activity that you specified, please describe the importance of integrating your inland bathymetric data with other datasets. For each data type, identify *how important* the data integration is to your Mission Critical Activity. Examples of data integration would be data that align either spatially and/or temporally or attribute codes that are logically consistent. See FAQ #25.

Importance rating: Required; Highly desirable; Nice to have; Not required

	Required	Highly desirable	Nice to have	Not required
Data Type				
Aerial and/or satellite imagery				
Geologic and/or seismic data				
Shorelines - current, historic, change rates				
Land Use/ Land Cover				
Wetlands				
Inland surface water features (streams, lakes, ponds, reservoirs)				
Bridges				
Landmark features				
Cultural resources				
Coastal and riverine structures - shoreline stabilization structures, levees, dams, jetties, piers, weirs, etc.				
Other (please specify and				

Question 34a. For the inland bathymetry portion of your Mission Critical Activity, please describe the bathymetric data you currently using. Please include information about its Quality Level and date if known. Please include yourself if you are acquiring inland bathymetry. Please enter text. See FAQ #18 for information about how to identify available data.

Please be patient, this question can take up to 30 seconds to load.

Question 34b. For the inland bathymetry portion of your Mission Critical Activity, please tell us where you access bathymetric data. Check all that apply. See FAQ #19.

- [ ] Digital Coast
- [ ] NOAA National Centers for Environmental Information (NCEI)
- [ ] NOAA nautical charts, including electronic charts

- [ ] USACE Inland Electronic Navigation Charts
- [ ] USGS Coastal and Marine Geology Program Inland Waters of the United States Map Server
- [ ] USGS Data Series
- [ ] Data that meets my needs is not available
- [ ] State Repository (ies)
- [ ] Other (please describe):

Question 34b1. Please describe which State Repository (ies) you utilize.

Question 34c. What benefits relative to your program are you now realizing from *currently available* inland bathymetric data? Check the option that most closely describes the benefits for each benefit type. See benefits example document for more information.

	Major	Moderate	Minor	None	Don't know	Inland bathy data not available
Current Benefits from existing inland 3D bathymetric data						
Operational Benefits						
Time savings						
Cost savings or cost reduction (i.e. savings on purchases)						
Cost avoidance						
Increased revenues to the organization						
Mission-driven performance improvements						
Customer Service Benefits						
Value added to products or services						
Improved response or timeliness						
Improved customer experience						
Societal Benefits						
Education or outreach						
Environmental benefits						
Public safety, including life and property						
Other (please describe in your own words)						
Please describe						

Question 35. The following series of tables apply to the FUTURE benefits that your program would gain from inland 3D bathymetric elevation data if ALL of the requirements you provided above could be met for the selected Mission Critical Activity. The future benefits are broken into three main categories: Operational, Customer Service, and Societal, and then into subcategories (e.g. Time savings, Cost Avoidance, etc). Each subcategory contains potential types of benefits. If you have another category and/or type of benefit not provided below, please write in your own response. See benefits example document for more information.

For each benefit type please indicate the following:

- Benefits your program is likely to receive - Select the option that most closely describes the magnitude of benefits your program is likely to receive for each benefit type, on a scale from 'None' to 'Major'. 'Don't know' is also an option.

- Quantification of Benefits - Please quantify any operational and/or customer service benefits you are likely to receive. Each benefit subcategory has its own quantification metric (e.g. Time Savings is type of hours saved (annual or monthly) and amount of those hours saved (e.g. 80)).

- Briefly Describe the Benefit

1. Briefly describe any major benefits. A few examples are provided as follows: fewer field visits would be required, or having authoritative data readily downloadable from a single site would save work hours, or we could perform more accurate and efficient modeling, or improved data would improve our ability to protect critical habitat areas.
2. For benefits you quantified, also briefly describe how you quantified the benefit. For example: fewer field visits would be required, 2 hours/field visit for 200 fewer field visits a year = 400 annual hours saved.

	Benefits your program is likely to receive					Hours Saved				Amount of Hours Saved	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D inland bathymetric data											
Time Savings											
Hours saved from faster and/or avoided field visits/inspections											
Hours saved through more efficient modeling, reviews, reporting, data dissemination, mapping, or other procedures											
Hours saved from reduced or avoided data manipulation (e.g., combining data from multiple sources; changing projection, datum, etc.)											
Hours saved from reduced or avoided data errors											
Hours saved through in-office project planning or monitoring											
Hours saved from more streamlined operations (e.g., permitting processes, offshore boundary determinations, etc.)											
Other (please describe)											

	Benefits your program is likely to receive					Dollars Saved				Amount of Dollars Saved	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual dollars saved	Monthly dollars saved	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D inland bathymetric data											
Cost Savings or Cost Reduction (i.e. savings on purchases)											
Data acquisition costs saved, reduced or available to spend on other projects											
Materials saved (e.g., fertilizer, pesticides, water, irrigation systems, pond design, beach/dune restoration, building/construction materials, etc.)											
Other (please describe)											

	Benefits your program is likely to receive					Dollars Saved				Amount of Dollars Saved	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual dollars saved	Monthly dollars saved	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D inland bathymetric data											
Cost Avoidance											
Data processing avoided (e.g., classifying point clouds, quality control, hydrotreatment, etc.)											
Data errors avoided											
Avoided loss of property due to natural hazards or disaster events											
Avoided accidents caused by human error due to lack of information (e.g. crashes, aviation incidents, marine accidents, oil spills)											
Other (please describe)											

	Benefits your program is likely to receive					Dollars Realized/Earned				Amount of Dollars Realized/Earned	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual dollars realized	Monthly dollars realized	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D inland bathymetric data											
Increased Revenues to the Organization											
Improved harvest or extraction yields (e.g., timber, agriculture, fisheries, minerals, oil/gas, etc.)											
Increased cargo carrying capacity											
New products, services, or applications/apps sold											
Other (please describe)											

	Benefits your program is likely to receive					Improvement				Percent Improvement	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual Percent Improvement		I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D inland bathymetric data											
Mission-driven Performance Improvements											
Increased program effectiveness											
Improved ability to carry out mission											
Improved decision making due to better data, modeling, etc.											
Other (please describe)											

	Benefits your program is likely to receive					Hours/Dollars Saved						Amount of Hours/Dollars Saved	Comments
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved	Monthly dollars saved	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D inland bathymetric data													
Other (please describe in your own words)													
Please describe													

	Benefits your program is likely to receive					Hour/Dollar Benefits						Amount of Hours/Dollars Saved	Please
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved/dollars realized	Monthly dollars saved/dollars realized	I don't know how to estimate	Unable to provide		
Future Customer Service Benefits from 3D inland bathymetric data													
Value Added to Products or Services (Benefits to the Customer/User)													

New products, services or applications/apps (e.g., solar or green roof potential, GPS navigation, recreation opportunities, etc.)													
Improved accuracy of products or services (e.g. navigation charts, nautical charts, shoreline delineation, flood hazard maps, flood warnings, etc.)													
Other (please describe)													

	Benefits your program is likely to receive					Hour/Dollar Benefits						Amount of Hours/Dollars Saved	Please
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved/dollars realized	Monthly dollars saved/dollars realized	I don't know how to estimate	Unable to provide		
Future Customer Service Benefits from 3D inland bathymetric data													
Improved Response or Timeliness (Benefits to the Customer/User)													
Faster reviews and approvals (e.g., permitting approval, EIS reviews, boundary determinations, etc.)													
Faster response to an incident or event (e.g., faster access to impacted areas, faster response and recovery operations, improved evacuation plans, etc.)													
Faster recovery after an event (e.g., faster port reopening after hurricane, faster identification of damaged structures, faster information about Advisory Base Flood Elevations, etc.)													
Improved customer assistance (e.g., use of data allows virtual view and support via phone, email, chat)													
More up to date services or products (e.g., nautical charts, navigation charts, flood hazard maps, etc.)													
Improved projections of at-risk locations and/or faster warning to the public of impending natural or man-made hazards (e.g., flood, fire, tsunami, active shooter, etc.)													
Other (please describe)													

	Benefits your program is likely to receive					Hour/Dollar Benefits						Amount of Hours/Dollars Saved	Please
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved/dollars realized	Monthly dollars saved/dollars realized	I don't know how to estimate	Unable to provide		
Future Customer Service Benefits from 3D inland bathymetric data													
Improved Customer Experience													
Increased customer confidence in products or services													
New services, tools, or applications/apps													
Better data availability (faster downloads, data are													

all in one place, etc.)

Other (please describe)													

	Benefits your program is likely to receive					Hour/Dollar Benefits						Amount of Hours/Dollars Saved	C
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved/dollars realized	Monthly dollars saved/dollars realized	I don't know how to estimate	Unable to provide		
Future Customer Service Benefits from 3D inland bathymetric data													
Other (please describe in your own words)													
Please describe													

	Benefits your program is likely to receive					Please describe in your own words:
	Major	Moderate	Minor	None	Don't know	
Future Societal Benefits from 3D inland bathymetric data						
Societal Benefits						
Education or outreach						
Environmental benefits						
Public safety, including life and property						

	Benefits your program is likely to receive					Comments
	Major	Moderate	Minor	None	Don't know	
Future Societal Benefits from 3D inland bathymetric data						
Other (please describe in your own words)						
Please describe						

Part 3.3 - Questions for Nearshore Requirements

***Please be patient, this question can take up to 30 seconds to load.**

Question 36. In this section, please identify the geographic area requirements for the nearshore portion of your Mission Critical Activity described above. For the purposes of this study, the nearshore waters will be considered to include the Great Lakes and go out to approximately the 10 meter depth contour in most areas and out to the 20 meter depth contour in clear waters (e.g. the Florida Keys).

We need to understand geographic area requirements for each Mission Critical Activity. Questionnaire participants are encouraged to describe their geographic (area of coverage) requirements using the provided pick lists. Alternatively, a shapefile, KML, or geodatabase for your geographic Area(s) of Interest may be provided.

My geographic area requirements are:

- ○ Nationwide, the nearshore coastal area (including the Great Lakes)
- ○ One or more national maritime boundaries
- ○ Nearshore areas along the coast of one or more states, territories, or counties (including Great Lakes states)
- ○ Nearshore areas along the coast (including the Great Lakes) of one or more Hydrologic Units
- ○ Nearshore areas along the coast (including the Great Lakes) of Federally-owned lands nationwide, all lands of U.S. Tribes, or select large land holding agencies
- ○ Marine sanctuaries and/or marine national monuments. See FAQ #26.
- ○ None of the above; I will provide my own shapefile, KML, or geodatabase

***Question 36a. If your geographic area requirements for 3D bathymetric data for your Mission Critical Activity apply to the nearshore coastal areas nationwide, please check the items below that best represent your nationwide requirements.**

- ☐ 48 conterminous states (including the Great Lakes)
- ☐ Alaska
- ☐ Hawai'i
- ☐ American Samoa
- ☐ Guam
- ☐ Northern Mariana Islands
- ☐ Federated States of Micronesia
- ☐ Palau
- ☐ Marshall Islands
- ☐ U.S. Minor Outlying Islands (Baker Island, Howland Island, Jarvis Island, Johnston Island, Kingman Reef, Midway Islands, Navassa Island, Palmyra Atoll, and Wake Island)
- ☐ Puerto Rico
- ☐ U.S. Virgin Islands
- ☐ All of the above

***Question 36b. If your nearshore geographic area requirements pertain to maritime boundaries, please designate from the list below. Please select all that are required. See FAQ #27.**

- ☐ State waters
- ☐ Federal waters
- ☐ Navigationally significant areas
- ☐ Territorial sea (12 nautical miles)
- ☐ Contiguous zone (24 nautical miles)
- ☐ Outer Continental Shelf
- ☐ Exclusive Economic Zone (200 nautical miles)

***Question 36c. If the geographic area requirements for 3D bathymetric data for your Mission Critical Activity are for the nearshore areas along the coast of one or more states or counties (including Great Lakes states), please check the state(s) below that are required. After you select the state(s) you will be allowed to identify sub-regions (counties) where nearshore 3D bathymetric data are required.**

☐ Alabama	☐ Maine	☐ Palau
☐ Alaska	☐ Marshall Islands	☐ Pennsylvania
☐ American Samoa	☐ Maryland	☐ Puerto Rico
☐ California	☐ Massachusetts	☐ Rhode Island
☐ Connecticut	☐ Michigan	☐ South Carolina
☐ Delaware	☐ Minnesota	☐ Texas

- [ ] Federated States of Micronesia
- [ ] Florida
- [ ] Georgia
- [ ] Guam
- [ ] Hawai'i
- [ ] Illinois
- [ ] Indiana
- [ ] Louisiana
- [ ] Mississippi
- [ ] New Hampshire
- [ ] New Jersey
- [ ] New York
- [ ] North Carolina
- [ ] Northern Mariana Islands
- [ ] Ohio
- [ ] Oregon
- [ ] U.S. Minor Outlying Islands
- [ ] U.S. Virgin Islands
- [ ] Virginia
- [ ] Washington
- [ ] Washington, D.C.
- [ ] Wisconsin

Please be patient, this question can take up to 30 seconds to load.

Question 36c1. Do you have any sub-regions (counties or cities) where nearshore 3D bathymetric information is required?

- ○ Yes
- ○ No

Question 36c2. Please list the sub-regions (counties or cities) where nearshore 3D bathymetric information is required. Enter sub-region (county or city) first and then state (example: Fairfax County, VA or Chicago, IL).

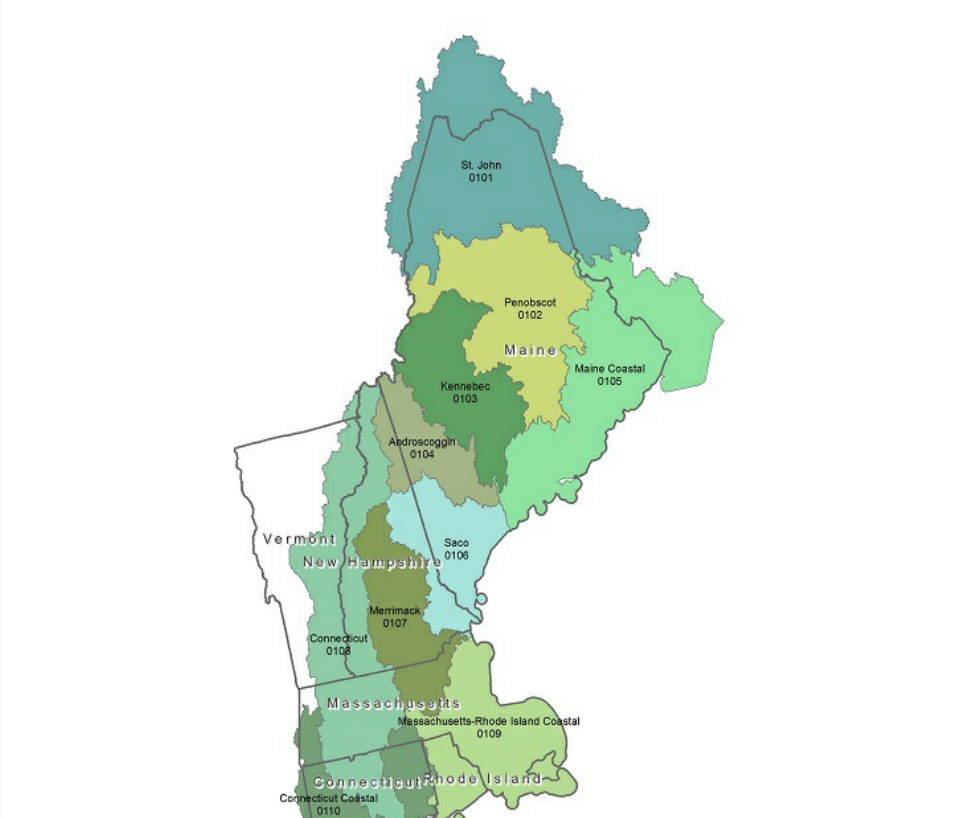
***Please be patient, this question can take up to 30 seconds to load.**

Question 36d. If your geographic area requirements pertain to the nearshore areas along the coast (including the Great Lakes) of one or more hydrologic units (HUs), please check the appropriate hydrologic region(s) (2-digit HUs) below. This will lead you to select individual 4-digit HUs nested within your hydrologic region. Please select all that are required.

- [ ] 01 New England
- [ ] 02 Mid-Atlantic
- [ ] 03 South Atlantic-Gulf
- [ ] 04 Great Lakes
- [ ] 07 Upper Mississippi
- [ ] 08 Lower Mississippi
- [ ] 12 Texas – Gulf
- [ ] 13 Rio Grande
- [ ] 17 Pacific Northwest
- [ ] 18 California
- [ ] 19 Alaska
- [ ] 20 Hawai'i
- [ ] 21 Caribbean
- [ ] 22 Pacific Islands

Question 36d1. 01 New England

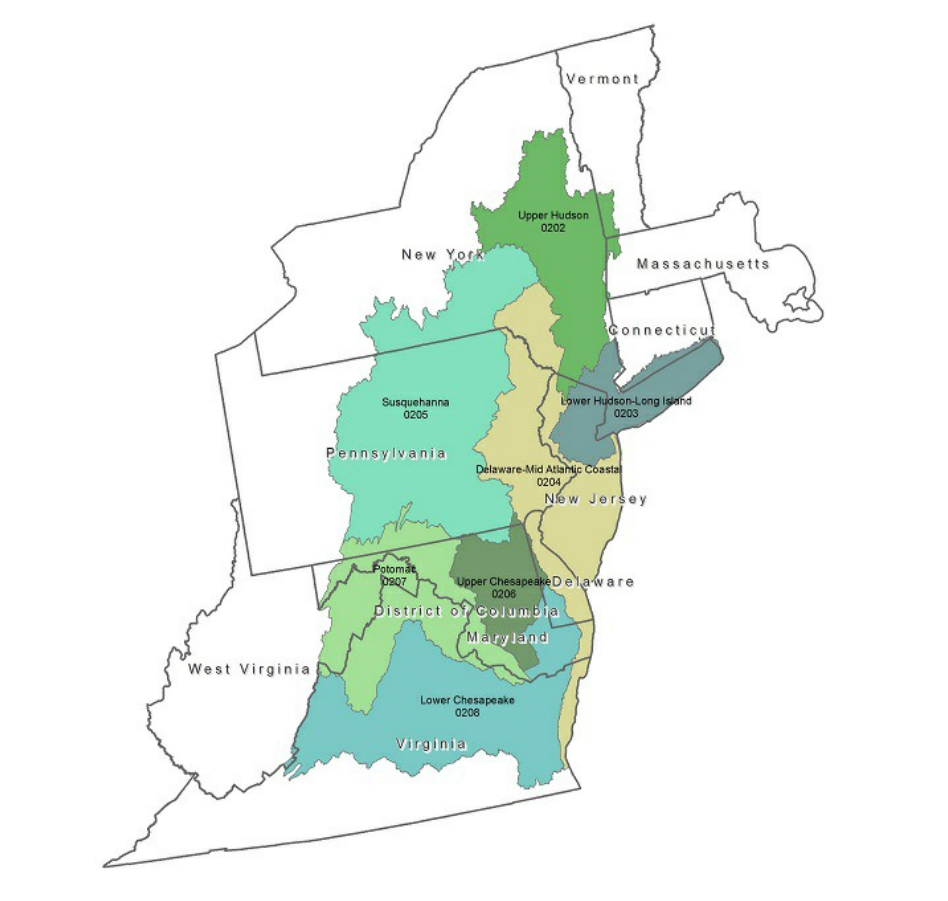
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0101 - St. John
- [ ] 0102 - Penobscot
- [ ] 0103 - Kennebec
- [ ] 0104 - Androscoggin
- [ ] 0105 - Maine Coastal
- [ ] 0106 - Saco
- [ ] 0107 - Merrimack
- [ ] 0108 - Connecticut
- [ ] 0109 - Massachusetts-Rhode Island Coastal
- [ ] 0110 - Connecticut Coastal
- [ ] All codes

Question 36d2. 02 Mid-Atlantic

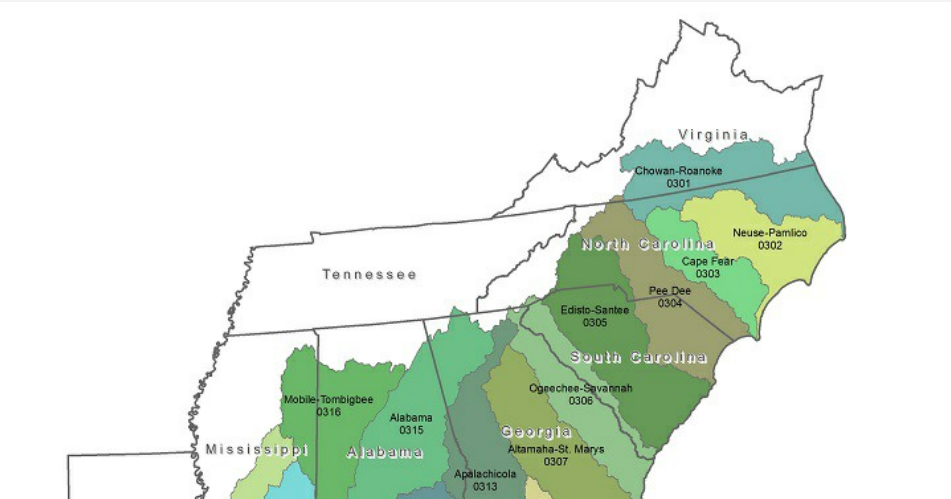
Please select individual HUC-4 codes for your specific hydrologic units.

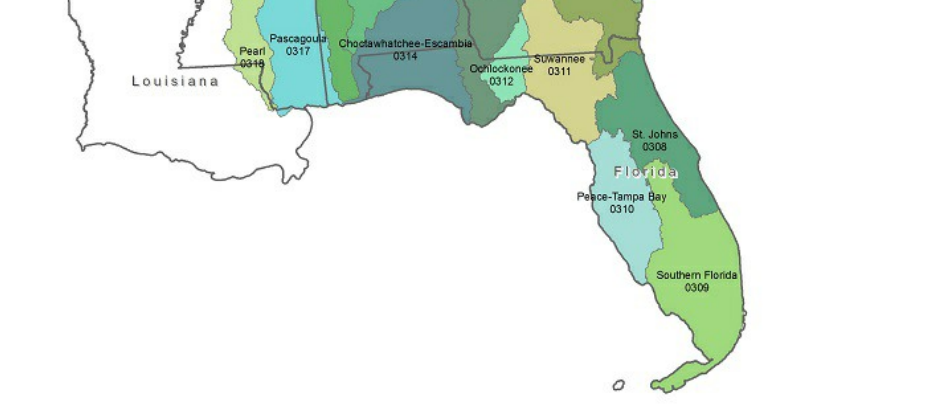


- [ ] 0202 - Upper Hudson
- [ ] 0203 - Lower Hudson-Long Island
- [ ] 0204 - Delaware-Mid Atlantic Coastal
- [ ] 0205 - Susquehanna
- [ ] 0206 - Upper Chesapeake
- [ ] 0207 - Potomac
- [ ] 0208 - Lower Chesapeake
- [ ] All codes

Question 36d3. 03 South Atlantic-Gulf

Please select individual HUC-4 codes for your specific hydrologic units.

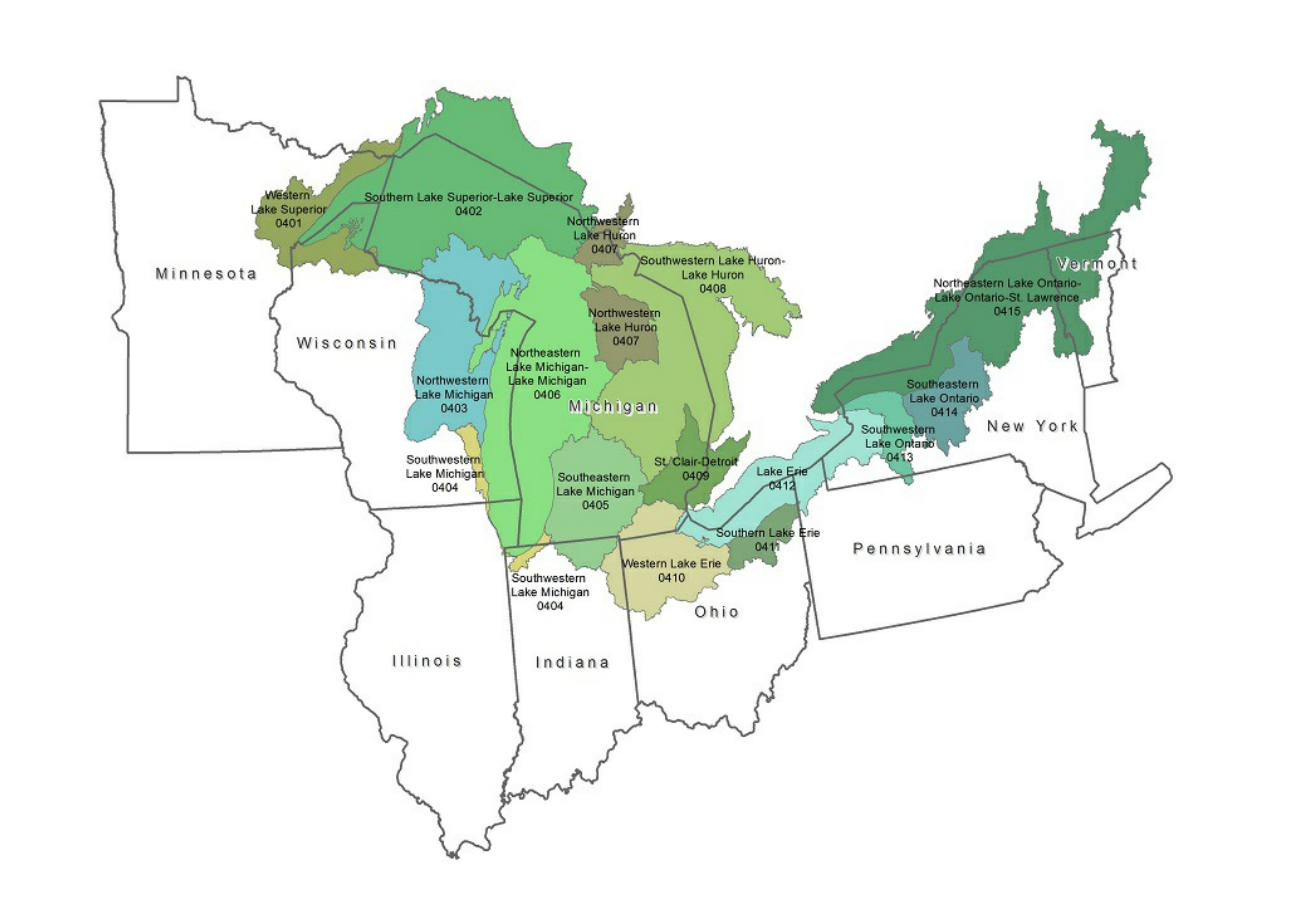




- [ ] 0301 - Chowan-Roanoke
- [ ] 0302 - Neuse-Pamlico
- [ ] 0303 - Cape Fear
- [ ] 0304 - Pee Dee
- [ ] 0305 - Edisto-Santee
- [ ] 0306 - Ogeechee-Savannah
- [ ] 0307 - Altamaha-St. Marys
- [ ] 0308 - St. Johns
- [ ] 0309 - Southern Florida
- [ ] 0310 - Peace-Tampa Bay
- [ ] 0311 - Suwannee
- [ ] 0312 - Ochlockonee
- [ ] 0313 - Apalachicola
- [ ] 0314 - Choctawhatchee-Escambia
- [ ] 0315 - Alabama
- [ ] 0316 - Mobile-Tombigbee
- [ ] 0317 - Pascagoula
- [ ] 0318 - Pearl
- [ ] All codes

Question 36d4. 04 Great Lakes

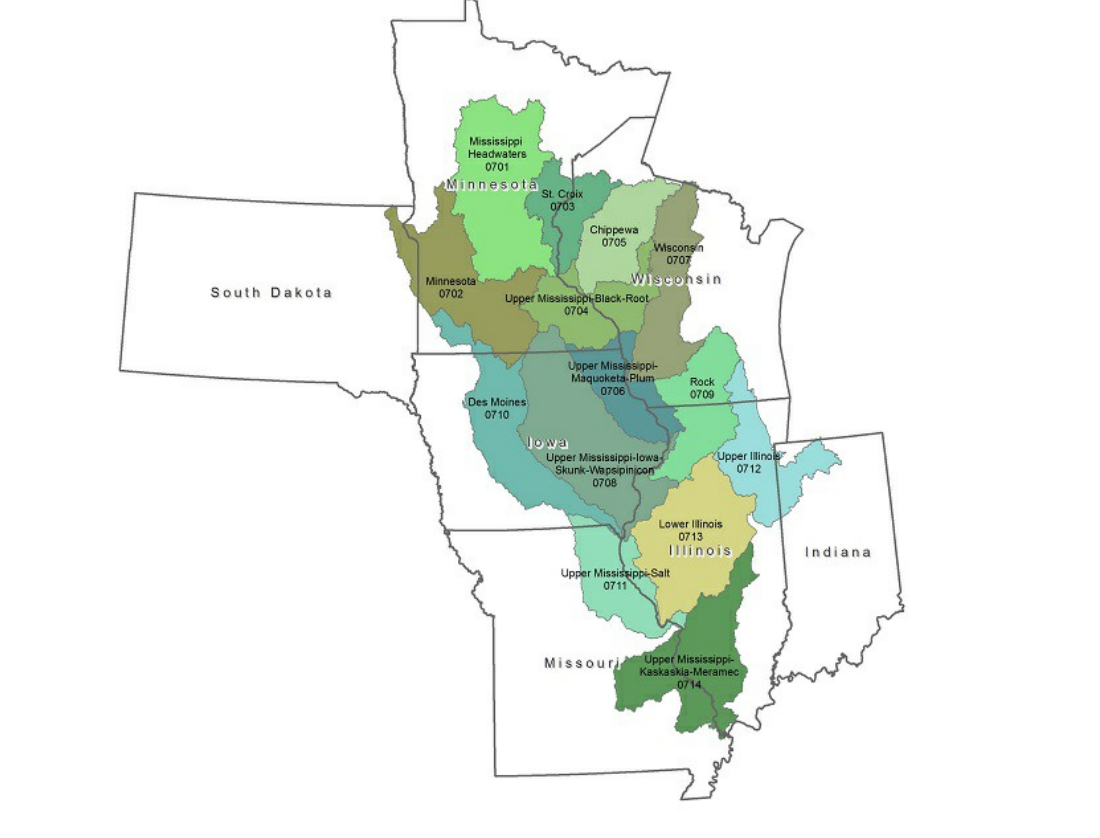
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0401 - Western Lake Superior
- [ ] 0402 - Southern Lake Superior-Lake Superior
- [ ] 0403 - Northwestern Lake Michigan
- [ ] 0404 - Southwestern Lake Michigan
- [ ] 0405 - Southeastern Lake Michigan
- [ ] 0406 - Northeastern Lake Michigan-Lake Michigan
- [ ] 0407 - Northwestern Lake Huron
- [ ] 0408 - Southwestern Lake Huron-Lake Huron
- [ ] 0409 - St. Clair-Detroit
- [ ] 0410 - Western Lake Erie
- [ ] 0411 - Southern Lake Erie
- [ ] 0412 - Lake Erie
- [ ] 0413 - Southwestern Lake Ontario
- [ ] 0414 - Southeastern Lake Ontario
- [ ] 0415 - Northeastern Lake Ontario-Lake Ontario-St. Lawrence
- [ ] All codes

Question 36d5. 07 Upper Mississippi

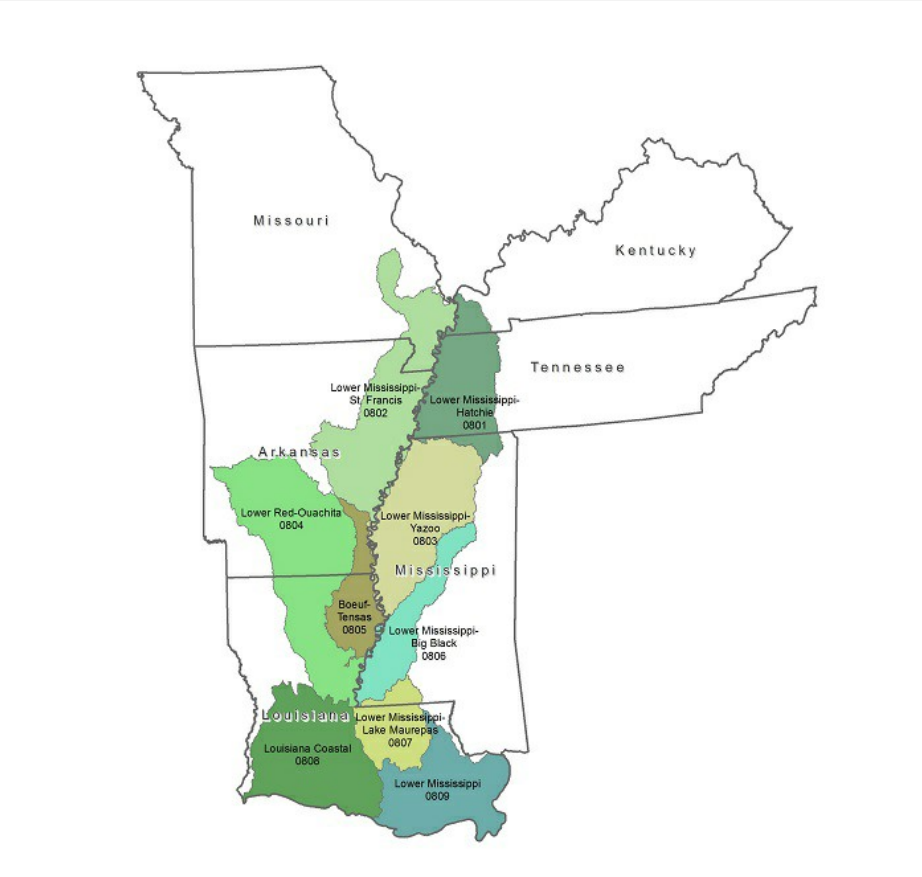
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0701 - Mississippi Headwaters
- [ ] 0702 - Minnesota
- [ ] 0703 - St. Croix
- [ ] 0704 - Upper Mississippi-Black-Root
- [ ] 0705 - Chippewa
- [ ] 0706 - Upper Mississippi-Maquoketa-Plum
- [ ] 0707 - Wisconsin
- [ ] 0708 - Upper Mississippi-Iowa-Skunk-Wapsipinicon
- [ ] 0709 - Rock
- [ ] 0710 - Des Moines
- [ ] 0711 - Upper Mississippi-Salt
- [ ] 0712 - Upper Illinois
- [ ] 0713 - Lower Illinois
- [ ] 0714 - Upper Mississippi-Kaskaskia-Meramec
- [ ] All codes

Question 36d6. 08 Lower Mississippi

Please select individual HUC-4 codes for your specific hydrologic units.

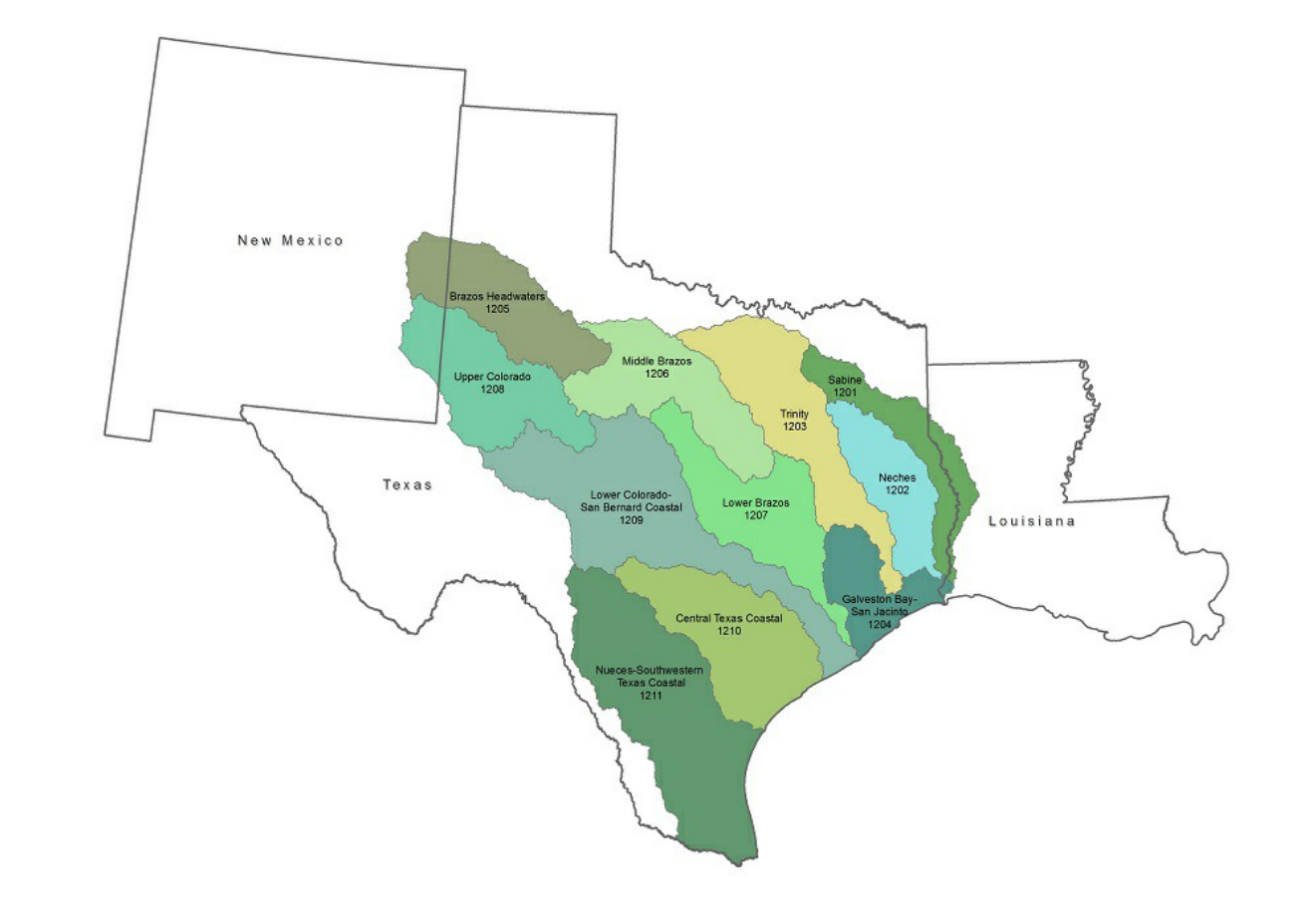


- [ ] 0801 - Lower Mississippi-Hatchie
- [ ] 0802 - Lower Mississippi-St. Francis
- [ ] 0803 - Lower Mississippi-Yazoo
- [ ] 0804 - Lower Red-Ouachita
- [ ] 0806 - Lower Mississippi-Big Black
- [ ] 0807 - Lower Mississippi-Lake Maurepas
- [ ] 0808 - Louisiana Coastal
- [ ] 0809 - Lower Mississippi

- [ ] 0805 - Boeuf-Tensas
- [ ] All codes

Question 36d7. 12 Texas – Gulf

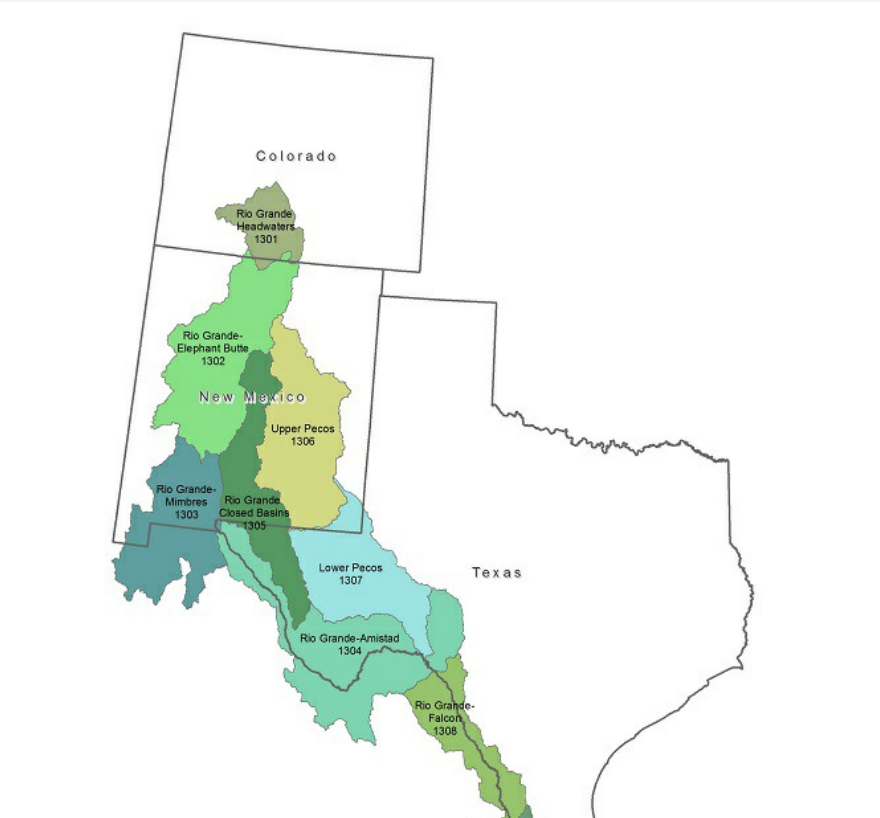
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1201 - Sabine
- [ ] 1202 - Neches
- [ ] 1203 - Trinity
- [ ] 1204 - Galveston Bay-San Jacinto
- [ ] 1205 - Brazos Headwaters
- [ ] 1206 - Middle Brazos
- [ ] 1207 - Lower Brazos
- [ ] 1208 - Upper Colorado
- [ ] 1209 - Lower Colorado-San Bernard Coastal
- [ ] 1210 - Central Texas Coastal
- [ ] 1211 - Nueces-Southwestern Texas Coastal
- [ ] All codes

Question 36d8. 13 Rio Grande

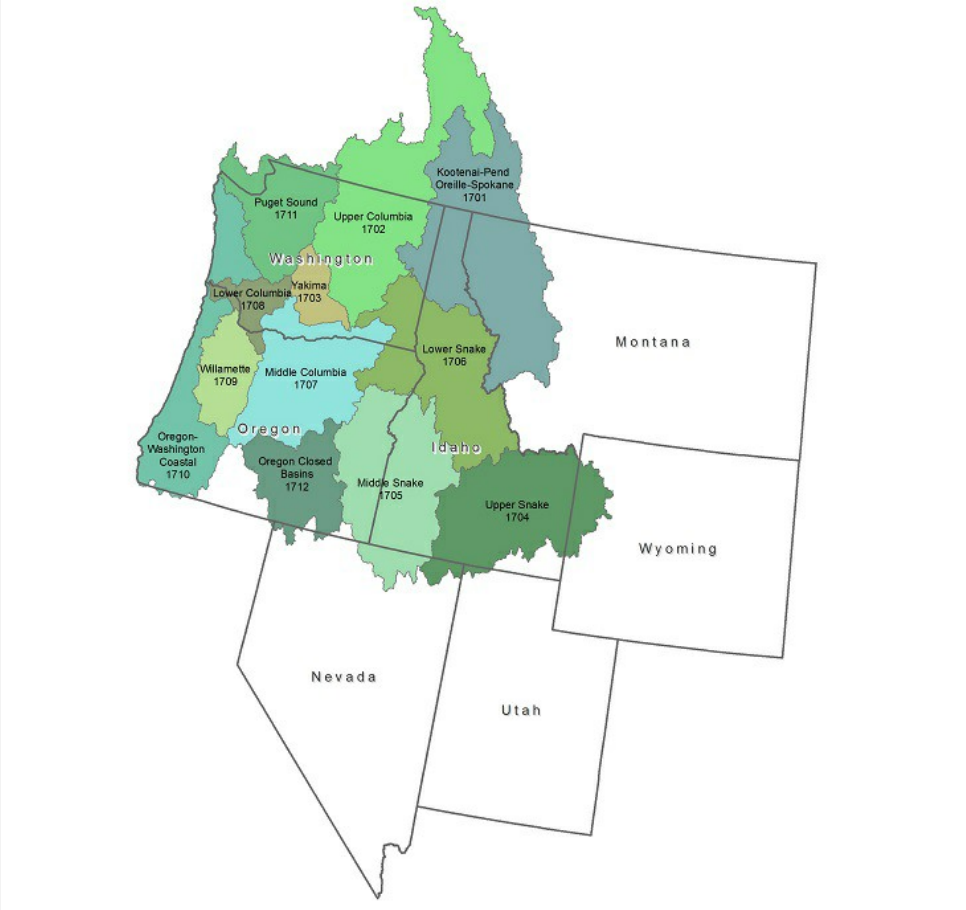
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1301 - Rio Grande Headwaters
- [ ] 1302 - Rio Grande-Elephant Butte
- [ ] 1303 - Rio Grande-Mimbres
- [ ] 1304 - Rio Grande-Amistad
- [ ] 1305 - Rio Grande Closed Basins
- [ ] 1306 - Upper Pecos
- [ ] 1307 - Lower Pecos
- [ ] 1308 - Rio Grande-Falcon
- [ ] 1309 - Lower Rio Grande
- [ ] All codes

Question 36d9. 17 Pacific Northwest

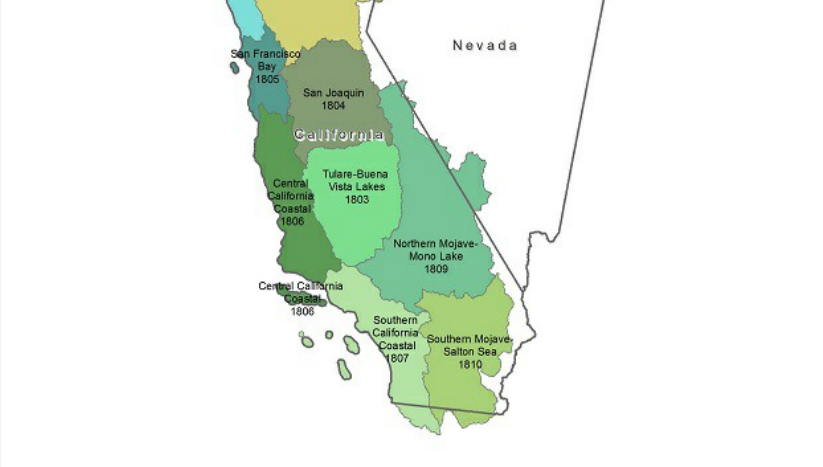
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1701 - Kootenai-Pend Oreille-Spokane
- [ ] 1702 - Upper Columbia
- [ ] 1703 - Yakima
- [ ] 1704 - Upper Snake
- [ ] 1705 - Middle Snake
- [ ] 1706 - Lower Snake
- [ ] 1707 - Middle Columbia
- [ ] 1708 - Lower Columbia
- [ ] 1709 - Willamette
- [ ] 1710 - Oregon-Washington Coastal
- [ ] 1711 - Puget Sound
- [ ] 1712 - Oregon Closed Basins
- [ ] All codes

Question 36d10. 18 California

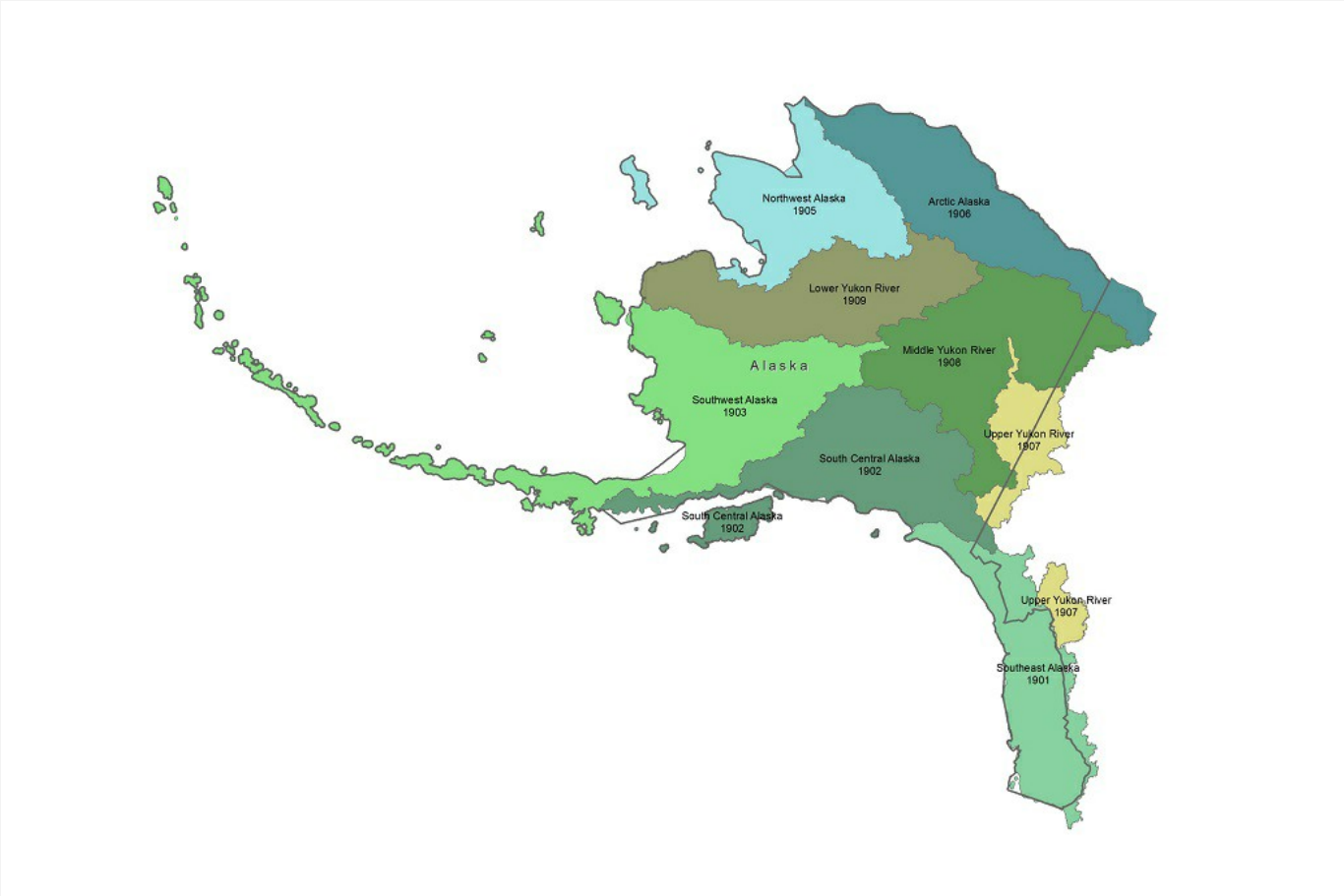
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1801 - Klamath-Northern California Coastal
- [ ] 1802 - Sacramento
- [ ] 1803 - Tulare-Buena Vista Lakes
- [ ] 1804 - San Joaquin
- [ ] 1805 - San Francisco Bay
- [ ] 1806 - Central California Coastal
- [ ] 1807 - Southern California Coastal
- [ ] 1808 - North Lahontan
- [ ] 1809 - Northern Mojave-Mono Lake
- [ ] 1810 - Southern Mojave-Salton Sea
- [ ] All codes

Question 36d11. 19 Alaska

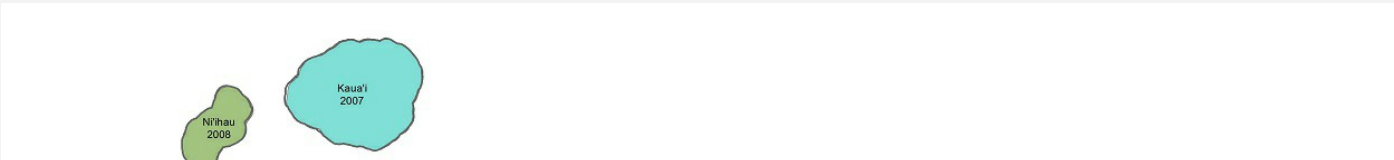
Please select individual HUC-4 codes for your specific hydrologic units.

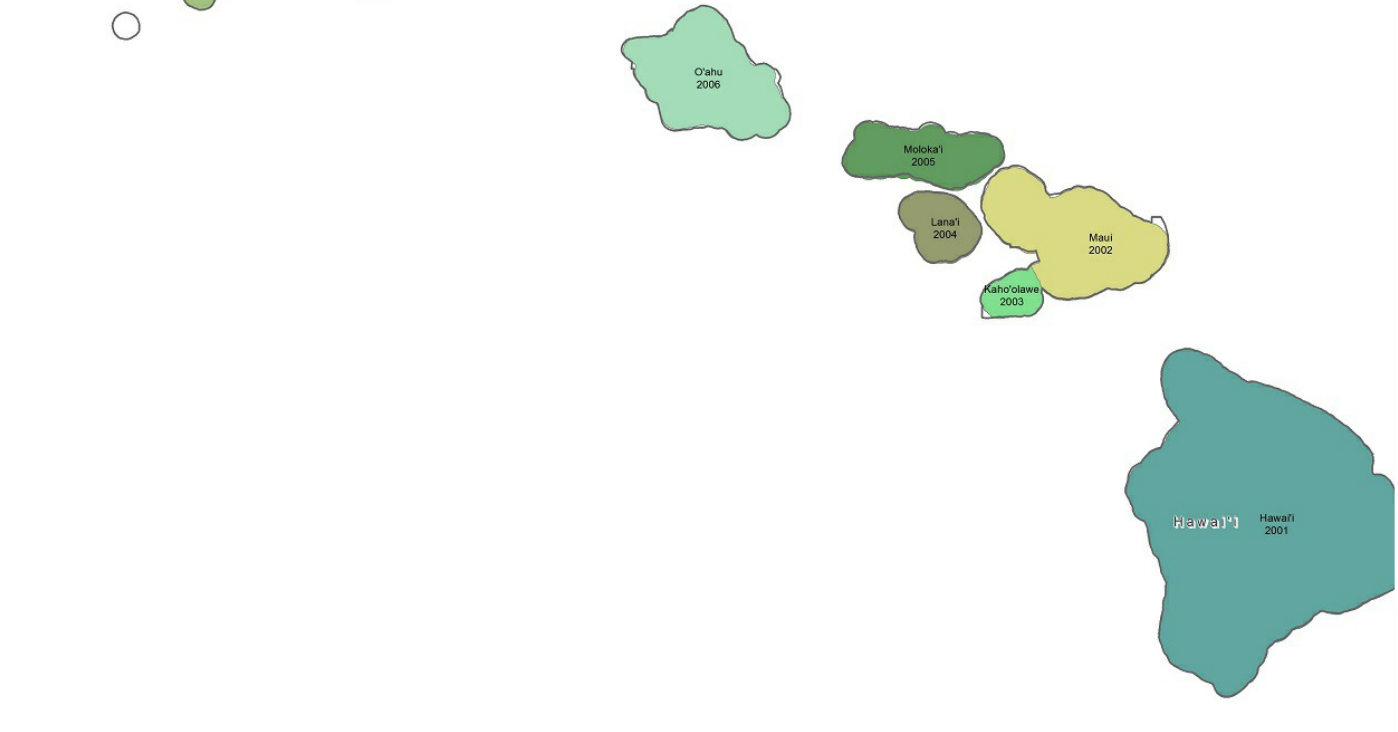


- [ ] 1901 - Southeast Alaska
- [ ] 1902 - South Central Alaska
- [ ] 1903 - Southwest Alaska
- [ ] 1905 - Northwest Alaska
- [ ] 1906 - Arctic Alaska
- [ ] 1907 - Upper Yukon River
- [ ] 1908 - Middle Yukon River
- [ ] 1909 - Lower Yukon River
- [ ] All codes

Question 36d12. 20 Hawai'i

Please select individual HUC-4 codes for your specific hydrologic units.

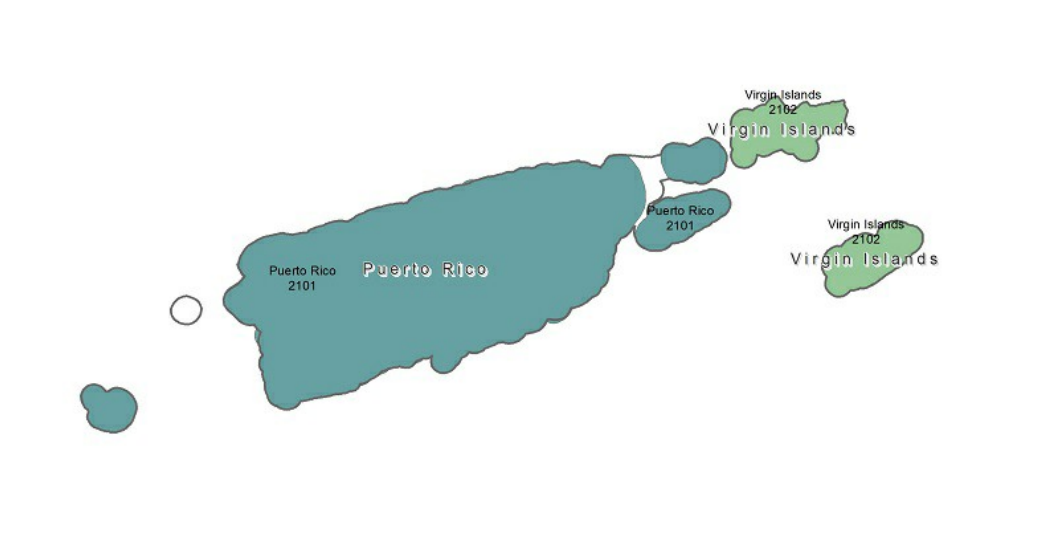




- [ ] 2001 - Hawai'i
- [ ] 2004 - Lana'i
- [ ] 2007 - Kaua'i
- [ ] 2002 - Maui
- [ ] 2005 - Moloka'i
- [ ] 2008 - Ni'ihau
- [ ] 2003 - Kaho'olawe
- [ ] 2006 - O'ahu
- [ ] All codes

Question 36d13. 21 Caribbean

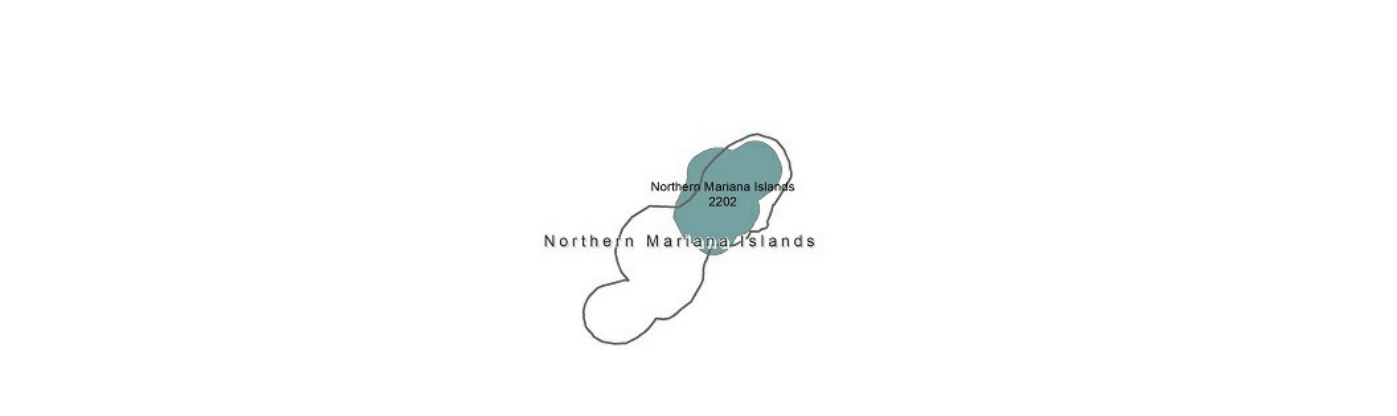
Please select individual HUC-4 codes for your specific hydrologic units.

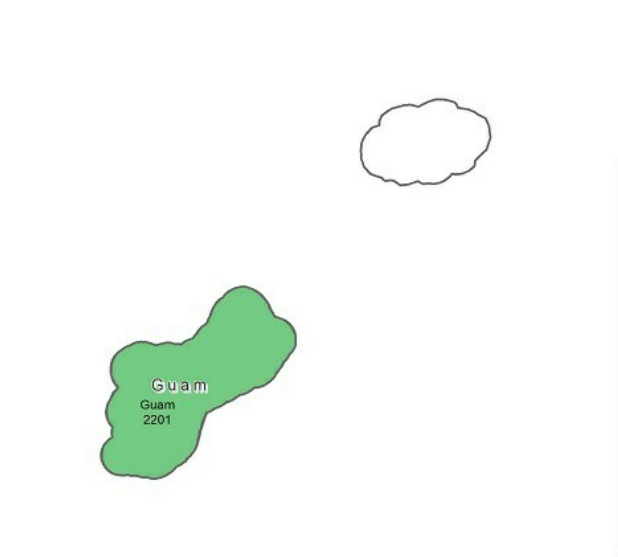


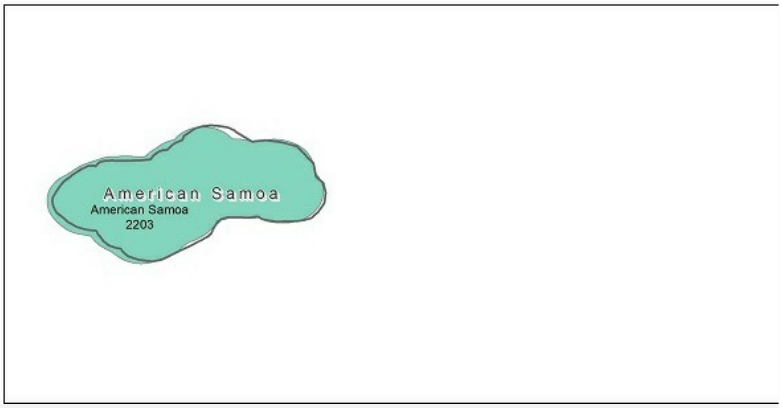
- [ ] 2101 - Puerto Rico
- [ ] 2102 - Virgin Islands
- [ ] All codes

Question 36d14. 22 Pacific Islands

Please select individual HUC-4 codes for your specific hydrologic units.







- [ ] 2201 - Guam
- [ ] 2202 - Northern Mariana Islands
- [ ] 2203 - American Samoa
- [ ] All codes

***Question 36e. If your geographic area requirements pertain to nearshore areas along the coast (including the Great Lakes) of selected Federally-owned or Tribal lands, please designate below. Please select all that are required.**

- [ ] All Federally owned lands
- [ ] American Indian reservations, off-reservation trust lands, Alaska Native areas, and Hawaiian home lands
- [ ] Bureau of Land Management (BLM)
- [ ] Department of Defense (DOD)
- [ ] National Park Service (NPS)
- [ ] U.S. Forest Service (USFS)
- [ ] U.S. Fish and Wildlife Service (USFWS)
- [ ] Other (enter name and/or description):

***Question 36f. If your nearshore geographic area requirements pertain to marine sanctuaries and/or marine national monuments, please designate from the list below. Please select all that are required. See FAQ #26.**

- [ ] American Samoa
- [ ] Channel Islands
- [ ] Cordell Bank
- [ ] Florida Keys
- [ ] Flower Garden Banks
- [ ] Gray's Reef
- [ ] Greater Farallones
- [ ] Hawaiian Islands Humpback Whale
- [ ] Marianas Trench
- [ ] Monitor
- [ ] Monterey Bay
- [ ] Olympic Coast
- [ ] Papahanaumokuakea
- [ ] Rose Atoll
- [ ] Stellwagen Bank
- [ ] Thunder Bay
- [ ] All of the above

***Question 36g. If applicable, please submit your nearshore geographic area requirements by emailing your shapefile(s), KML, or geodatabase to the project team at 3DNationStudy@usgs.gov and provide a unique filename that includes your organization and Mission Critical Activity, or abbreviations thereof (e.g., MN_DNR_stormwater_mgt or EPA_eBeaches). The projection and datum (.prj file) information must be included. Please enter the filename below. See FAQ #6.**

Question 37. What amount of horizontal error is acceptable in your nearshore bathymetric data? In other words, what is the needed Total Horizontal Uncertainty (THU) of your nearshore 3D bathymetric data at the 95% confidence level? Check one. See FAQ #21 for background information.

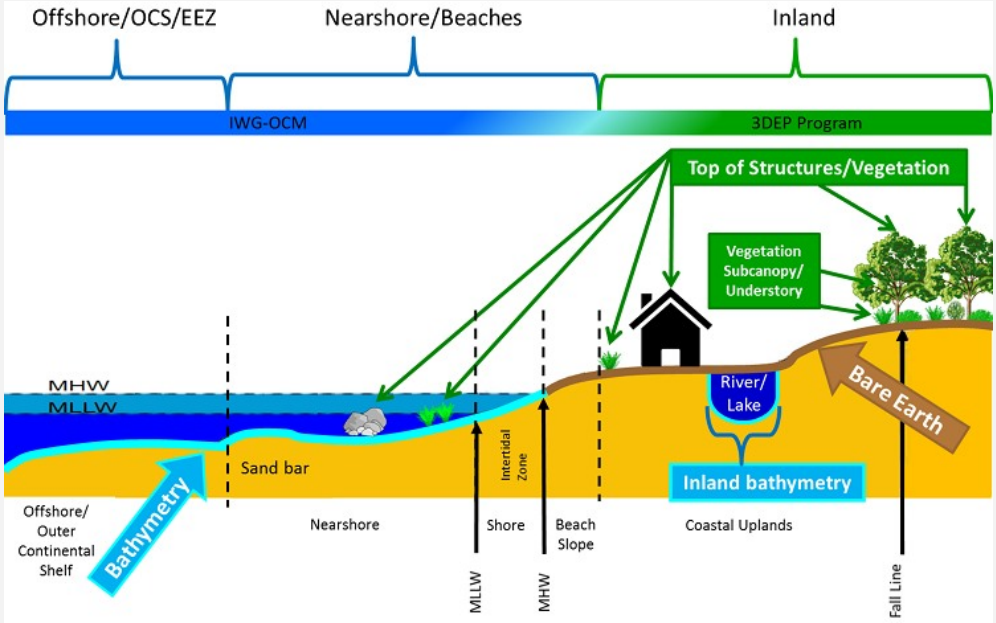
- ( ) Less than 50 cm
- ( ) Up to 1 meter
- ( ) Up to 2 meters
- ( ) Up to 5 meters
- ( ) Up to 10 meters
- ( ) Up to 20 meters
- ( ) Greater than 20 meters
- ( ) The best horizontal accuracy achievable for the vertical accuracy I need

- I don't know

Question 38. What amount of vertical error is acceptable in your nearshore bathymetric data? In other words, what is the needed Total Vertical Uncertainty (TVU) of your nearshore 3D bathymetric data at the 95% confidence level? Check one. See FAQ #22 for background information.

- Less than 10 cm
- Up to 20 cm
- Up to 30 cm
- Up to 40 cm
- Up to 50 cm
- Up to 60 cm
- Up to 80 cm
- Up to 1 meter
- Greater than 1 meter
- I don't know

Question 39a. For the nearshore portion of your Mission Critical Activity, how far onshore do you need 3D elevation data? Check one. See FAQ #9.



- 500 meters inland
- 1 kilometer inland
- >1 kilometer inland
- To cover the beach slope
- To cover the coastal uplands
- To the fall line
- To Mean Higher High Water (MHHW)
- To Mean High Water (MHW)
- To Mean Lower Low Water (MLLW)
- None. I do not need onshore data.
- Other (please describe):

Question 39b. How far down the beach profile do you need 3D bathymetric data to support your Mission Critical Activity? Check only one. See FAQ #9.

- To Mean Higher High Water (MHHW)
- To Mean High Water (MHW)
- To Mean Lower Low Water (MLLW)
- Below MLLW
- None
- Other (please describe):

Please be patient, this question can take up to 30 seconds to load.

Question 40a. For the nearshore bathymetry portion of your Mission Critical Activity, does partial bottom coverage (e.g., transects) meet your requirements for nearshore bathymetric data? Check one. See FAQ #10.

- Yes, for the entire Area of Interest for my Mission Critical Activity
- Yes, for part of my Area of Interest
- No, I need full bottom coverage of nearshore bathymetric data

Question 40b. Please specify the vertical accuracy and longitudinal sampling density required for the transects. If your transect requirement is for a portion of the Area of Interest for your Mission Critical Activity, please also describe where you require transects.

***Question 40c. What bathymetric or topobathymetric Quality Level (QL_B) do you require for the nearshore portion of your Mission Critical Activity? Check one QL_B only, chosen from the table below. Note that the vertical accuracy specification for $QL0_B$ and $QL1_B$ is equivalent to the International Hydrographic Organization (IHO) Special Order standard, and the vertical accuracy specification for $QL4_B$ is equivalent to the IHO Order 1 standard for vertical accuracy. See FAQ #23.**

	$QL0_B$	$QL1_B$	$QL2_B$	$QL3_B$	$QL4_B$
	IHO Special Order				IHO Order 1
Aggregate Nominal Pulse Spacing	≤0.7m	≤2.0 m	≤0.7m	≤2.0 m	≤5.0 m
Aggregate Nominal Pulse Density	≥2.0 pts/m²	≥0.25 pts/m²	≥2.0 pts/m²	≥0.25 pts/m²	≥0.04 pts/m²
Total Vertical Uncertainty (TVU)[1] (95% Confidence Level)	a = 0.25m b = 0.0075	a = 0.25m b = 0.0075	a = 0.30m b = 0.0130	a = 0.30m b = 0.0130	a = 0.5m b = 0.013
Depth Examples (m)	Depth Accuracy at 95% Confidence Level (cm)				
0	25.0	25.0	30.0	30.0	50.0
10	26.1	26.1	32.7	32.7	51.7
20	29.2	29.2	39.7	39.7	56.4
Example Applications	Detailed site surveys requiring the highest accuracy and highest resolution seafloor definition; dredging and inshore engineering surveys; high-resolution surveys of ports and harbors		Charting surveys; regional sediment management; general bathymetric mapping; coastal science and management applications; change analysis; deep water surveys; environmental analyses		Recon/planning; all general applications not requiring higher resolution and accuracy

[1] The formula below is to be used to compute, at the 95% confidence level, the maximum allowable TVU. The parameters "a" and "b" for each Order, together with the depth "d" are used to calculate the maximum allowable TVU for a specific depth:

Where: $\pm\sqrt{a^2 + (b \times d)^2}$

a represents that portion of the uncertainty that does not vary with depth

b is a coefficient which represents that portion of the uncertainty that varies with depth

d is the depth

b x d represents that portion of the uncertainty that varies with depth

- QL0B
- QL1B
- QL2B
- QL3B
- QL4B
- Coarser bathymetric data satisfies my needs

- I don't know
- I need higher quality data. Please describe:

***Question 41. For the nearshore portion of your Mission Critical Activity, how frequently do the nearshore 3D bathymetric data need to be updated to satisfy your requirements? Stated another way, your Mission Critical Activity requires data no older than:_____. Please select one. See FAQ #12.**

- Annually (one year)
- 2-3 years
- 4-5 years
- 6-10 years
- >10 years
- Event driven only – Data need to coincide with a specific event
- Other (please describe):

Question 42. For the nearshore portion of your Mission Critical Activity, do the Quality Level (or cross section/transect vertical accuracy and sampling density) and update frequency you just specified apply to the entire geographic Area of Interest you specified? An example might be someone who specified an Area of Interest as the nearshore waters of the State of Florida, but whose requirements are for $QL0_B$ data for the Florida Keys and $QL2_B$ data for the remainder of the Florida coastal area, each updated every 5 years. Another example might be someone who specified an Area of Interest as the nearshore waters of the 48 conterminous states, but who requires $QL2_B$ data updated every 2 years for the Atlantic and Pacific coasts and $QL0_B$ data updated every year for the Gulf Coast and the Great Lakes.

- Yes, my requirements apply to my entire Area of Interest
- No, my requirements vary across my Area of Interest. Please describe:

Question 43. Do you have a requirement for data to be tide corrected? Check one. See FAQ #28.

- No requirement for tide correction
- Tide correction using Mean High Water (MHW)
- Tide correction using Mean Sea Level (MSL)
- Tide correction using Mean Lower Low Water (MLLW)
- I don't know
- Tide correction using other datum (please describe):

Question 44a. For the Mission Critical Activity that you specified, please describe the importance of seamless integration within the nearshore bathymetric/topobathymetric data for your Area of Interest (AOI). For each type of data integration, identify how important it is that data are integrated across/between the different nearshore bathymetric/topobathymetric data collects that are often required to obtain nearshore bathymetric/topobathymetric data for an entire AOI. Examples of data integration would be data collected at the same time (temporal integration) or data that spatially align between adjacent geographic areas (spatial integration). See FAQ #14.

Importance rating: Required; Highly desirable; Nice to have; Not required

	Seamless integration between nearshore bathymetric and/or topobathymetric data collections across your Area of Interest			
	Required	Highly desirable	Nice to have	Not required
Temporal Integration				
Entire AOI needs to be collected concurrently (i.e. in the same acquisition season/window)				
Entire AOI needs to be collected under similar environmental conditions (e.g., similar low streamflow, turbidity, or other weather conditions, etc.)				
Other (please describe an				
Spatial Integration				
Point Cloud or backscatter for entire AOI needs to be seamless (e.g., no obvious cliffs or voids where datasets join)				
Digital Terrain/Elevation Model for entire AOI needs to be seamless (e.g., no cliffs or voids where datasets join)				
Other (please describe an				

Question 44b. If you indicated you wanted seamless spatial integration of your nearshore bathymetric or topobathymetric data, what level of vertical manipulation are you willing to accept to achieve seamlessness? Check one. See FAQ #15 for background information.

- Up to the required Total Vertical Uncertainty (TVU) at the 95% confidence level
- Up to double the required TVU at the 95% confidence level
- Up to triple the required TVU at the 95% confidence level
- Whatever it takes to achieve seamlessness, including changes to the older, previously accepted dataset if it is proven to be less accurate than the newer
- I don't know
- Other (please describe):

Question 45. For the Mission Critical Activity that you specified, please describe the importance of the following nearshore 3D bathymetric data

products. For each data product, identify *how important* the 3D bathymetric data product is to your Mission Critical Activity. See FAQ #24.

Importance rating: Required; Highly desirable; Nice to have; Not required

	Required	Highly desirable	Nice to have	Not required
Data Products				
Digital Surface Model (DSM)				
Digital Terrain Model (DTM)				
Digital Elevation Model (DEM)				
Raw point cloud data				
Classified point cloud data (LAS classes)				
Edited/cube XYZ				
Full waveform				
Bathymetric Attributed Grid (BAG)				
National Vertical Datum Transformation Tool (V-Datum)				
Tide Predictions				
Tidal Constituent And Residual Interpolation (TCARI)				
Intensity imagery/sidescan imagery				
Ground control/ground truthing				
Other (please describe an				

Question 46. For the Mission Critical Activity that you specified, please describe the importance of integrating your nearshore 3D bathymetric data with other datasets. For each data type, identify *how important* the data integration is to your Mission Critical Activity. Examples of data integration would be data that align either spatially and/or temporally or attribute codes that are logically consistent. See FAQ #29.

Importance rating: Required; Highly desirable; Nice to have; Not required

	Required	Highly desirable	Nice to have	Not required
Data Type				
Hydrographic survey data				
Nautical and/or navigation charts				
Acoustic imagery of the seafloor				
Aerial and/or satellite imagery				
Underwater videography				
Bottom texture				
Bottom type - roughness and hardness, sediment type, density, grain size, color, contaminants, composition (organic, shell and mineral, sand percentage)				
Submerged features - shipwrecks, archaeological sites, rock outcrops, debris, pipelines, cables, wellheads, piles				
Subbottom characteristics				
Geologic and/or seismic data				
Water column properties - Physical properties				
Water column properties - Chemical properties				
Water column properties - Biological properties				
Currents				
Tide heights, wave heights				
Sea ice conditions				
Habitat distribution and classification - submerged vegetation, seafloor-dwelling organisms, fish stocks				
Boundaries - Exclusive Economic Zone (EEZ), continental shelf, marine sanctuaries and parks, Coastal Barrier Resources System (CBRS), archaeological and historic properties, restricted areas				
Routes - shipping, ferries, other vessel traffic routes				
Offshore cadastral				
Lease areas - Outer Continental Shelf (OCS), oil and gas, or sand resource lease blocks; renewable energy leases; dredge areas				
Fixed obstructions - aids to navigation, beacons, landmarks, wind turbines, drilling platforms and equipment				
Floating observation and navigation systems - buoys, monitoring stations, etc.				
Shorelines - current, historic, change rates				
Land Use/ Land Cover				
Wetlands				
Estuaries				
Inland surface water features (streams, lakes, ponds, reservoirs)				
Landmark features				
Cultural resources				

Coastal and riverine structures - shoreline stabilization structures, levees, dams, jetties, piers, weirs, etc.				
Overhead structures - bridge, overhead cable, overhead pipeline, etc.				
Other (please describe an				

Question 47a. For the nearshore bathymetry portion of your Mission Critical Activity, please tell us about the bathymetric data you are currently using. Please include information about its Quality Level and date if known. Please enter text. See FAQ #18 for information about how to identify available data.

Please be patient, this question can take up to 30 seconds to load.

Question 47b. For the nearshore bathymetry portion of your Mission Critical Activity, please tell us where you access bathymetric and/or topobathymetric data. Check all that apply. See FAQ #19.

- [ ] Digital Coast
- [ ] NOAA National Centers for Environmental Information (NCEI)
- [ ] NOAA nautical charts, including electronic charts
- [ ] USACE Inland Electronic Navigation Charts
- [ ] Marine Minerals Program GIS (MMP GIS)
- [ ] State Repository (ies)
- [ ] Other (please describe):

Question 47b1. Please describe which State Repository (ies) you utilize.

Question 47c. What benefits relative to your program are you now realizing from *currently available* nearshore 3D bathymetric data? Check the option that most closely describes the benefits for each benefit type. See benefits example document for more information.

	Major	Moderate	Minor	None	Don't know
Current Benefits from existing nearshore 3D bathymetric data					
Operational Benefits					
Time savings					
Cost savings or cost reduction (i.e. savings on purchases)					
Cost avoidance					
Increased revenues to the organization					
Mission-driven performance improvements					
Customer Service Benefits					
Value added to products or services					
Improved response or timeliness					
Improved customer experience					
Societal Benefits					
Education or outreach					
Environmental benefits					
Public safety, including life and property					
Other (please describe in your own words)					
Please describe					

Question 48. The following series of tables apply to the FUTURE benefits that your program would gain from nearshore 3D bathymetric elevation data if ALL of the requirements you provided above could be met for the selected Mission Critical Activity. The future benefits are broken into three main categories: Operational, Customer Service, and Societal, and then into subcategories (e.g. Time savings, Cost Avoidance, etc). Each subcategory contains potential types of benefits. If you have another category and/or type of benefit not provided below, please write in your own response. See benefits example document for more information.

For each benefit type please indicate the following:

- Benefits your program is likely to receive - Select the option that most closely describes the magnitude of benefits your program is likely to receive for each benefit type, on a scale from 'None' to 'Major'. 'Don't know' is also an option.

- Quantification of Benefits - Please quantify any operational and/or customer service benefits you are likely to receive. Each benefit subcategory has its own quantification metric (e.g. Time Savings is type of hours saved (annual or monthly) and amount of those hours saved (e.g. 80)).

- Briefly Describe the Benefit

1. Briefly describe any major benefits. A few examples are provided as follows: fewer field visits would be required, or having authoritative data readily downloadable from a single site would save work hours, or we could perform more accurate and efficient modeling, or improved data would improve our ability to protect critical habitat areas.
2. For benefits you quantified, also briefly describe how you quantified the benefit. For example: fewer field visits would be required, 2 hours/field visit for 200 fewer field visits a year = 400 annual hours saved.

	Benefits your program is likely to receive					Hours Saved				Amount of Hours Saved	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D nearshore bathymetric data											
Time Savings											
Hours saved from faster and/or avoided field visits/inspections.											
Hours saved through more efficient modeling, reviews, reporting, data dissemination, mapping, or other procedures											
Hours saved from reduced or avoided data manipulation (e.g., combining data from multiple sources; changing projection, datum, etc.)											
Hours saved from reduced or avoided data errors											
Hours saved through in-office project planning or monitoring											
Hours saved from more streamlined operations (e.g., permitting processes, offshore boundary determinations, etc.)											
Other (please describe)											

	Benefits your program is likely to receive					Dollars Saved				Amount of Dollars Saved	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual dollars saved	Monthly dollars saved	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D nearshore bathymetric data											
Cost Savings or Cost Reduction (i.e. savings on purchases)											
Data acquisition costs saved, reduced or available to spend on other projects											
Materials saved (e.g., fertilizer, pesticides, water, irrigation systems, pond design, beach/dune restoration, building/construction materials, etc.)											
Other (please describe)											

	Benefits your program is likely to receive					Dollars Saved				Amount of Dollars Saved	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual dollars saved	Monthly dollars saved	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D nearshore bathymetric data											
Cost Avoidance											
Data processing avoided (e.g., classifying point clouds, quality control, hydrotreatment, etc.)											
Data errors avoided											
Avoided loss of property due to natural hazards or disaster events											
Avoided accidents caused by human error due to lack of information (e.g. crashes, aviation incidents, marine accidents, oil spills)											
Other (please describe)											

	Benefits your program is likely to receive					Dollars Realized/Earned				Amount of Dollars Realized/Earned	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual dollars realized	Monthly dollars realized	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D nearshore bathymetric data											
Increased Revenues to the Organization											
Improved harvest or extraction yields (e.g., timber, agriculture, fisheries, minerals, oil/gas, etc.)											
Increased cargo carrying capacity											
New products, services, or applications/apps sold											
Other (please describe)											

	Benefits your program is likely to receive					Improvement				Percent Improvement	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual Percent Improvement		I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D nearshore bathymetric data											
Mission-driven Performance Improvements											
Increased program effectiveness											
Improved ability to carry out mission											
Improved decision making due to better data, modeling, etc.											
Other (please describe)											

	Benefits your program is likely to receive					Hours/Dollars Saved						Amount of Hours/Dollars Saved	Comments
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved	Monthly dollars saved	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D nearshore bathymetric data													
Please describe													

	Benefits your program is likely to receive					Hour/Dollar Benefits						Amount of Hours/Dollars Saved	Please
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved/dollars realized	Monthly dollars saved/dollars realized	I don't know how to estimate	Unable to provide		
Future Customer Service Benefits from 3D nearshore bathymetric data													
Value Added to Products or Services (Benefits to the Customer/User)													
New products, services or													

applications/apps (e.g., solar or green roof potential, GPS navigation, recreation opportunities, etc.)													
Improved accuracy of products or services (e.g. navigation charts, nautical charts, shoreline delineation, flood hazard maps, flood warnings, etc.)													
Other (please describe)													

	Benefits your program is likely to receive					Hour/Dollar Benefits						Amount of Hours/Dollars Saved	Please
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved/dollars realized	Monthly dollars saved/dollars realized	I don't know how to estimate	Unable to provide		
Future Customer Service Benefits from 3D nearshore bathymetric data													
Improved Response or Timeliness (Benefits to the Customer/User)													
Faster reviews and approvals (e.g., permitting approval, EIS reviews, boundary determinations, etc.)													
Faster response to an incident or event (e.g., faster access to impacted areas, faster response and recovery operations, improved evacuation plans, etc.)													
Faster recovery after an event (e.g., faster port reopening after hurricane, faster identification of damaged structures, faster information about Advisory Base Flood Elevations, etc.)													
Improved customer assistance (e.g., use of data allows virtual view and support via phone, email, chat)													
More up to date services or products (e.g., nautical charts, navigation charts, flood hazard maps, etc.)													
Improved projections of at-risk locations and/or faster warning to the public of impending natural or man-made hazards (e.g., flood, fire, tsunami, active shooter, etc.)													
Other (please describe)													

	Benefits your program is likely to receive					Hour/Dollar Benefits						Amount of Hours/Dollars Saved	Please
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved/dollars realized	Monthly dollars saved/dollars realized	I don't know how to estimate	Unable to provide		
Future Customer Service Benefits from 3D nearshore bathymetic data													
Improved Customer Experience													
Increased customer confidence in products or services													
New services, tools, or applications/apps													
Better data availability (faster downloads, data are all in one place, etc.)													

Other (please describe)													

	Benefits your program is likely to receive					Hour/Dollar Benefits					Amount of Hours/Dollars Saved	C
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved/dollars realized	Monthly dollars saved/dollars realized	I don't know how to estimate	Unable to provide		
Future Customer Service Benefits from 3D nearshore bathymetric data													
Other (please describe in your own words)													
Please describe													

	Benefits your program is likely to receive					Please describe in your own words:
	Major	Moderate	Minor	None	Don't know	
Future Societal Benefits from 3D nearshore bathymetric data						
Societal Benefits						
Education or outreach						
Environmental benefits						
Public safety, including life and property						

	Benefits your program is likely to receive					Comments
	Major	Moderate	Minor	None	Don't know	
Future Societal Benefits from 3D nearshore bathymetric data						
Other (please describe in your own words)						
Please describe						

Part 3.4 - Questions for Offshore Requirements

***Please be patient, this question can take up to 30 seconds to load.**

Question 49. In this section, please identify the geographic area requirements for the offshore portion of your Mission Critical Activity described above. For the purposes of this study, the offshore waters will be considered to include the Great Lakes and be those waters that are deeper than the 10 meter depth contour in most areas and the 20 meter depth contour in clear waters (e.g. the Florida Keys).

We need to understand geographic area requirements for each Mission Critical Activity. Questionnaire participants are encouraged to describe their geographic (area of coverage) requirements using the provided pick lists. Alternatively, a shapefile, KML, or geodatabase for your geographic Area(s) of Interest may be provided.

My geographic area requirements are:

- ○ All U.S. waters (including the Great Lakes)
- ○ One or more national maritime boundaries
- ○ Waters offshore of one or more states (including Great Lakes states), territories, or counties
- ○ Waters offshore (including the Great Lakes) of one or more Hydrologic Units
- ○ Waters offshore (including the Great Lakes) of Federally-owned lands nationwide, all lands of U.S. Tribes, or select large land holding agencies
- ○ Marine sanctuaries and/or marine national monuments. See FAQ #26.
- ○ None of the above; I will provide my own shapefile, KML, or geodatabase

***Question 49a. If the geographic area requirements for 3D bathymetric data for your Mission Critical Activity apply to offshore areas nationwide, please check the items below that best represent your nationwide requirements.**

- ☐ 48 conterminous states (including the Great Lakes)
- ☐ Alaska
- ☐ Hawai'i
- ☐ American Samoa
- ☐ Guam
- ☐ Northern Mariana Islands
- ☐ Federated States of Micronesia
- ☐ Palau
- ☐ Marshall Islands
- ☐ U.S. Minor Outlying Islands (Baker Island, Howland Island, Jarvis Island, Johnston Island, Kingman Reef, Midway Islands, Navassa Island, Palmyra Atoll, and Wake Island)
- ☐ Puerto Rico
- ☐ U.S. Virgin Islands
- ☐ All of the above

***Question 49b. If your offshore geographic area requirements pertain to maritime boundaries, please designate from the list below. Please select all that are required. See FAQ #27.**

- ☐ State waters
- ☐ Federal waters
- ☐ Navigationally significant areas
- ☐ Territorial sea (12 nautical miles)
- ☐ Contiguous zone (24 nautical miles)
- ☐ Outer Continental Shelf
- ☐ Exclusive Economic Zone (200 nautical miles)

***Please be patient, this question can take up to 30 seconds to load.**

Question 49c. If the geographic area requirements for 3D bathymetric data for your Mission Critical Activity are for areas offshore of one or more states or counties (including Great Lakes states), please check the state(s) below that are required. After you select the state(s) you will be allowed to identify sub-regions (counties) where offshore 3D bathymetric data are required.

☐ Alabama	☐ Maine	☐ Palau
☐ Alaska	☐ Marshall Islands	☐ Pennsylvania
☐ American Samoa	☐ Maryland	☐ Puerto Rico
☐ California	☐ Massachusetts	☐ Rhode Island

- [ ] Connecticut
- [ ] Delaware
- [ ] Federated States of Micronesia
- [ ] Florida
- [ ] Georgia
- [ ] Guam
- [ ] Hawai'i
- [ ] Illinois
- [ ] Indiana
- [ ] Louisiana
- [ ] Michigan
- [ ] Minnesota
- [ ] Mississippi
- [ ] New Hampshire
- [ ] New Jersey
- [ ] New York
- [ ] North Carolina
- [ ] Northern Mariana Islands
- [ ] Ohio
- [ ] Oregon
- [ ] South Carolina
- [ ] Texas
- [ ] U.S. Minor Outlying Islands
- [ ] U.S. Virgin Islands
- [ ] Virginia
- [ ] Washington
- [ ] Washington, D.C.
- [ ] Wisconsin

Please be patient, this question can take up to 30 seconds to load.

Question 49c1. Do you have any sub-regions (counties or cities) where offshore 3D bathymetric information is required?

- ○ Yes
- ○ No

Question 49c2. Please list the sub-regions (counties or cities) where offshore 3D bathymetric information is required. Enter sub-region (county or city) first and then state (example: Fairfax County, VA or Chicago, IL).

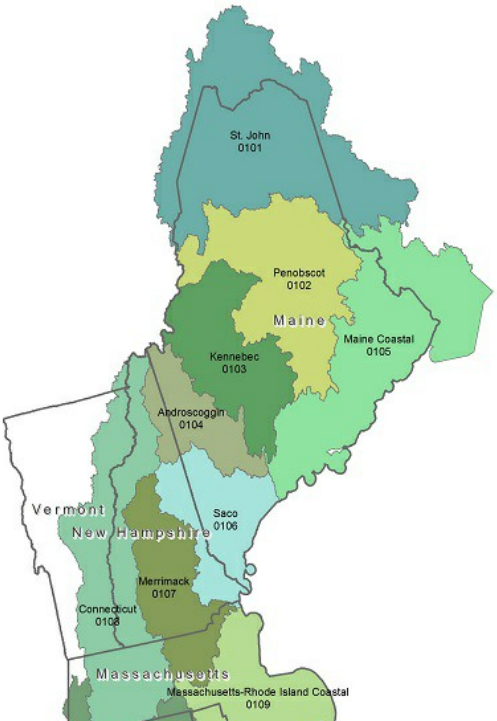
***Please be patient, this question can take up to 30 seconds to load.**

Question 49d. If your offshore geographic area requirements pertain to areas offshore (including the Great Lakes) of one or more hydrologic units (HUs), please check the appropriate hydrologic region(s) (2-digit HUs) below. This will lead you to select individual 4-digit HUs nested within your hydrologic region. Please select all that are required.

- [ ] 01 New England
- [ ] 02 Mid-Atlantic
- [ ] 03 South Atlantic-Gulf
- [ ] 04 Great Lakes
- [ ] 07 Upper Mississippi
- [ ] 08 Lower Mississippi
- [ ] 12 Texas – Gulf
- [ ] 13 Rio Grande
- [ ] 17 Pacific Northwest
- [ ] 18 California
- [ ] 19 Alaska
- [ ] 20 Hawai'i
- [ ] 21 Caribbean
- [ ] 22 Pacific Islands

Question 49d1. 01 New England

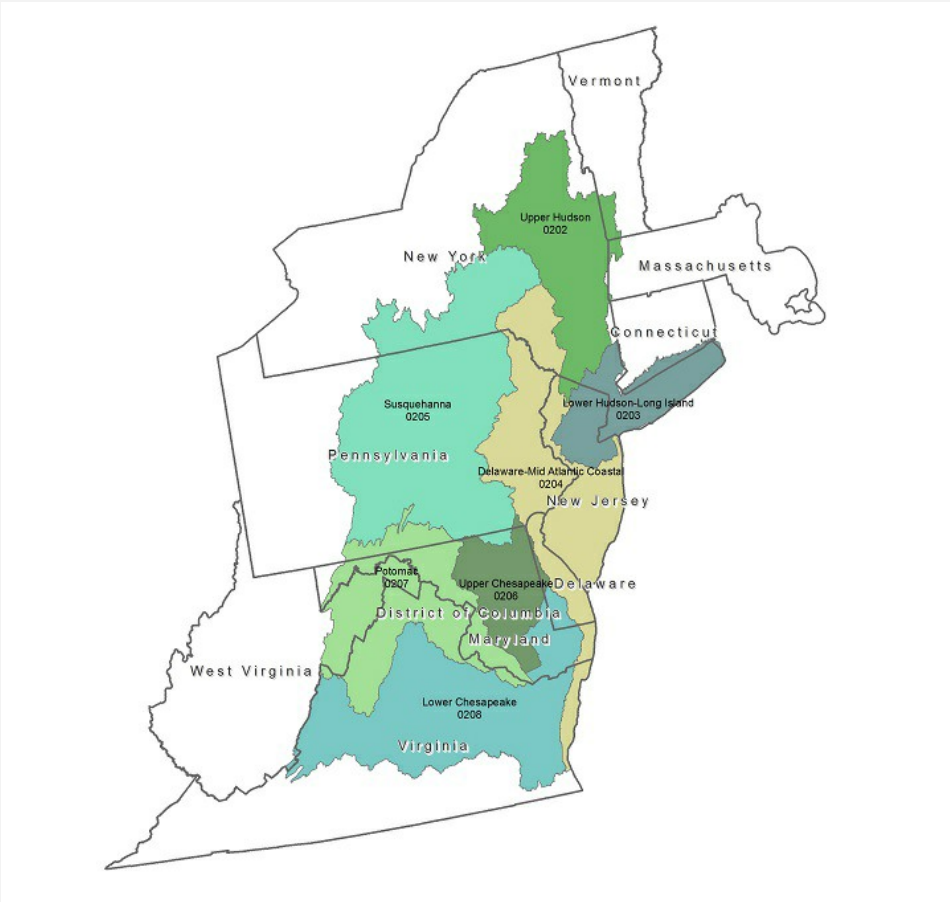
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0101 - St. John
- [ ] 0102 - Penobscot
- [ ] 0103 - Kennebec
- [ ] 0104 - Androscoggin
- [ ] 0105 - Maine Coastal
- [ ] 0106 - Saco
- [ ] 0107 - Merrimack
- [ ] 0108 - Connecticut
- [ ] 0109 - Massachusetts-Rhode Island Coastal
- [ ] 0110 - Connecticut Coastal
- [ ] All codes

Question 49d2. 02 Mid-Atlantic

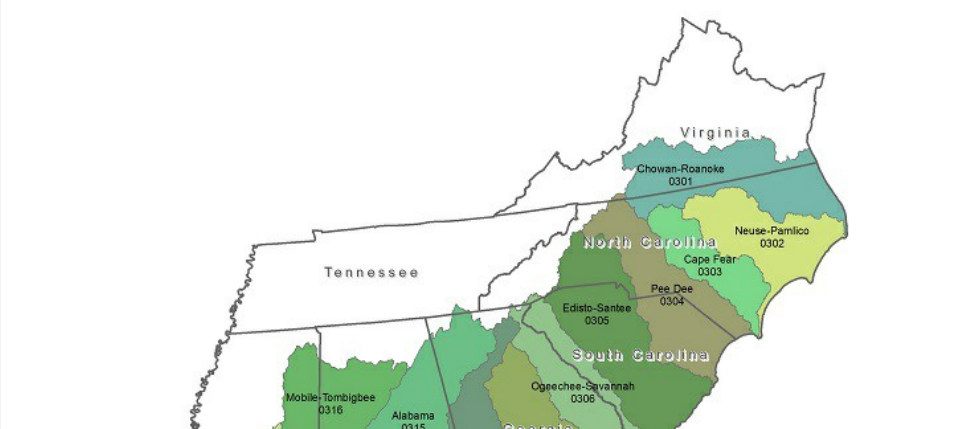
Please select individual HUC-4 codes for your specific hydrologic units.

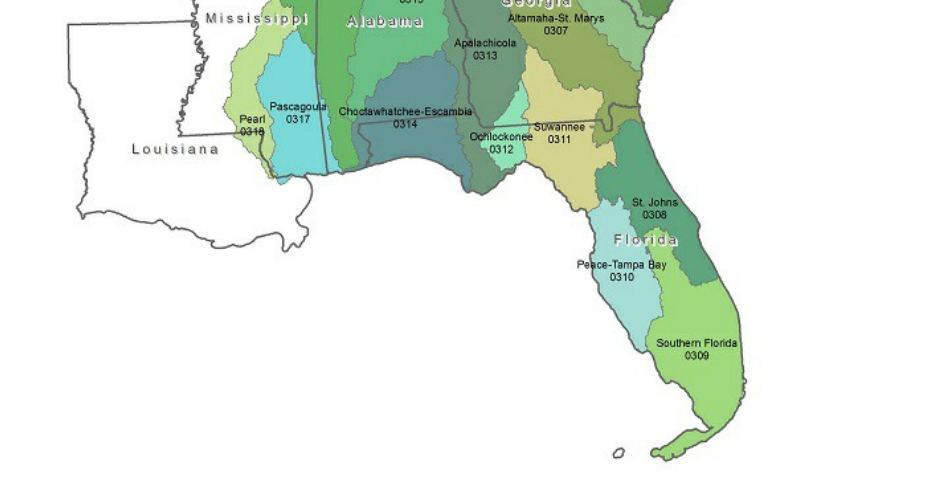


- [ ] 0202 - Upper Hudson
- [ ] 0203 - Lower Hudson-Long Island
- [ ] 0204 - Delaware-Mid Atlantic Coastal
- [ ] 0205 - Susquehanna
- [ ] 0206 - Upper Chesapeake
- [ ] 0207 - Potomac
- [ ] 0208 - Lower Chesapeake
- [ ] All codes

Question 49d3. 03 South Atlantic-Gulf

Please select individual HUC-4 codes for your specific hydrologic units.

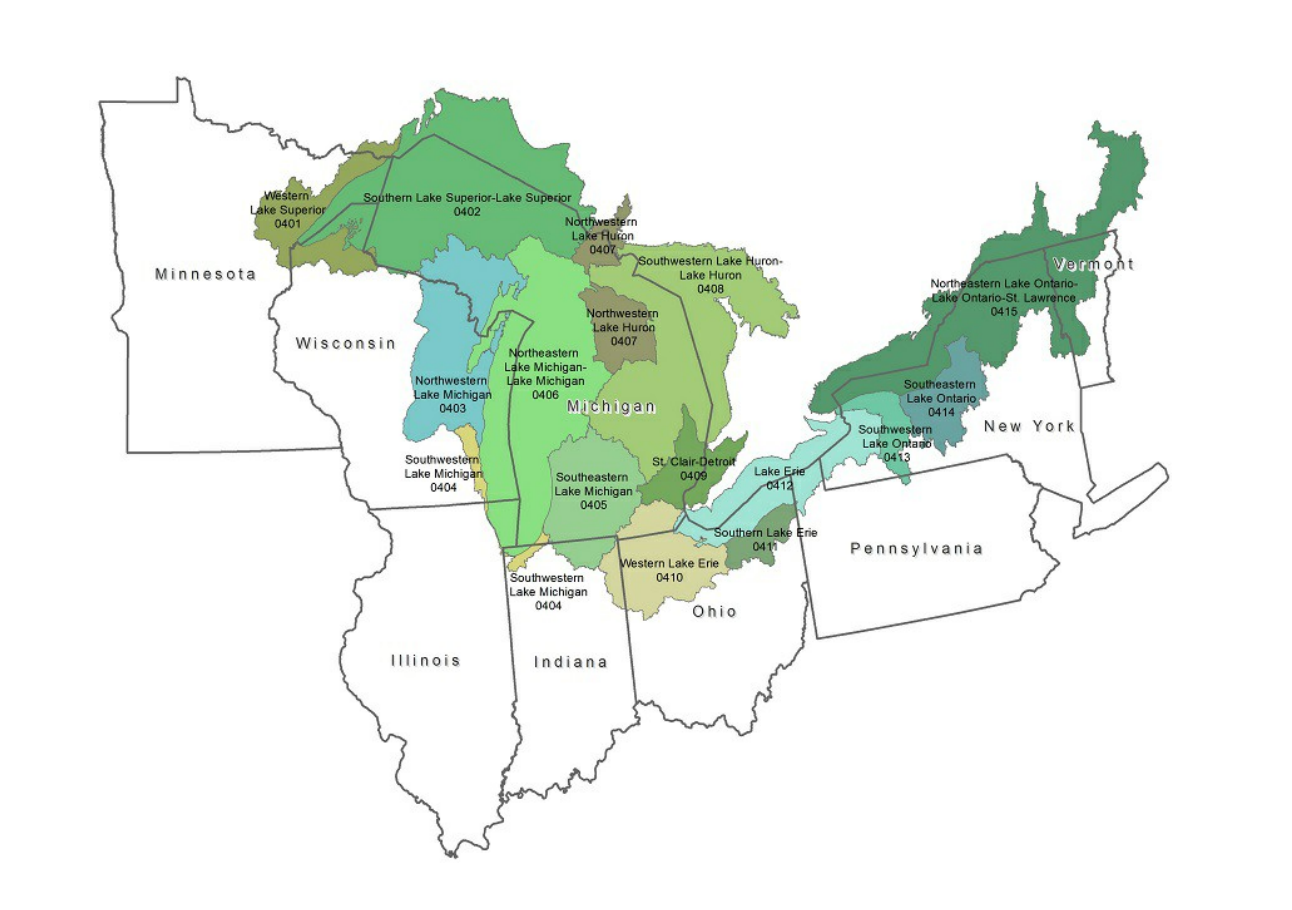




- [ ] 0301 - Chowan-Roanoke
- [ ] 0302 - Neuse-Pamlico
- [ ] 0303 - Cape Fear
- [ ] 0304 - Pee Dee
- [ ] 0305 - Edisto-Santee
- [ ] 0306 - Ogeechee-Savannah
- [ ] 0307 - Altamaha-St. Marys
- [ ] 0308 - St. Johns
- [ ] 0309 - Southern Florida
- [ ] 0310 - Peace-Tampa Bay
- [ ] 0311 - Suwannee
- [ ] 0312 - Ochlockonee
- [ ] 0313 - Apalachicola
- [ ] 0314 - Choctawhatchee-Escambia
- [ ] 0315 - Alabama
- [ ] 0316 - Mobile-Tombigbee
- [ ] 0317 - Pascagoula
- [ ] 0318 - Pearl
- [ ] All codes

Question 49d4. 04 Great Lakes

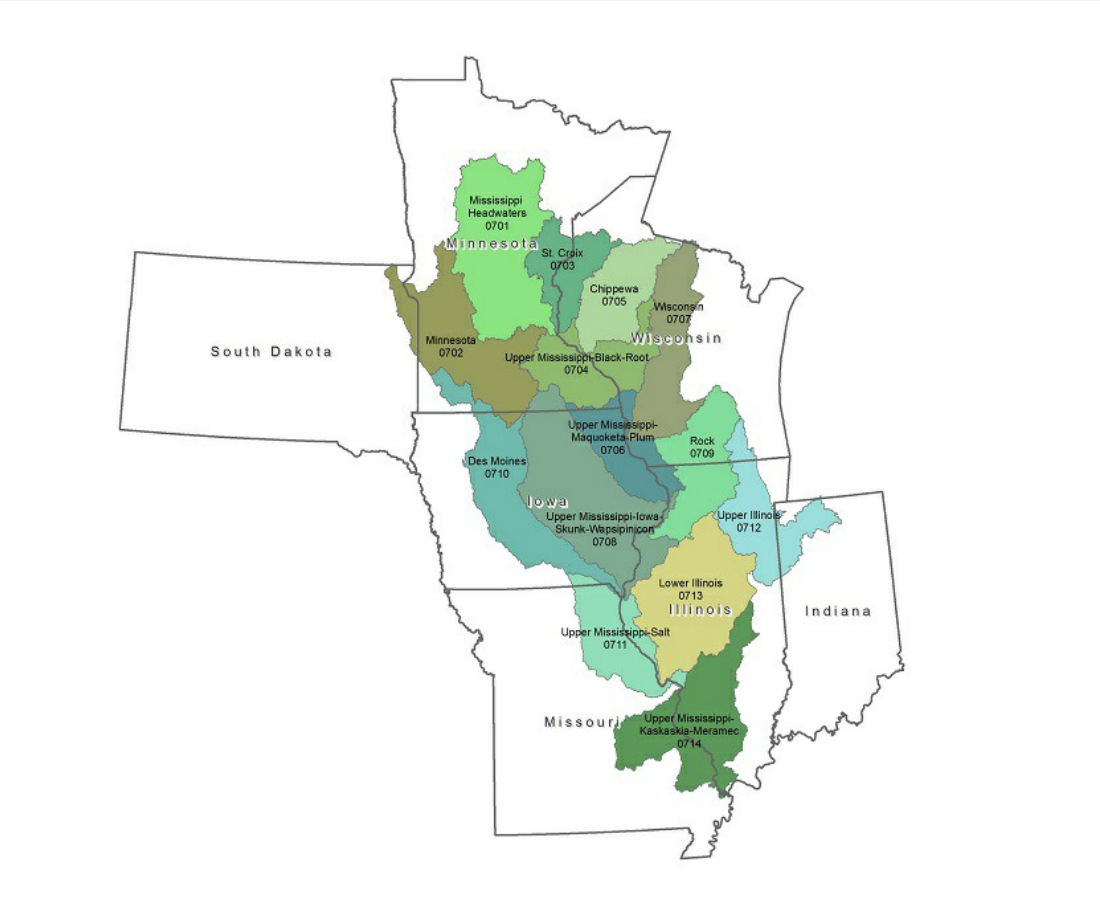
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0401 - Western Lake Superior
- [ ] 0402 - Southern Lake Superior-Lake Superior
- [ ] 0403 - Northwestern Lake Michigan
- [ ] 0404 - Southwestern Lake Michigan
- [ ] 0405 - Southeastern Lake Michigan
- [ ] 0406 - Northeastern Lake Michigan-Lake Michigan
- [ ] 0407 - Northwestern Lake Huron
- [ ] 0408 - Southwestern Lake Huron-Lake Huron
- [ ] 0409 - St. Clair-Detroit
- [ ] 0410 - Western Lake Erie
- [ ] 0411 - Southern Lake Erie
- [ ] 0412 - Lake Erie
- [ ] 0413 - Southwestern Lake Ontario
- [ ] 0414 - Southeastern Lake Ontario
- [ ] 0415 - Northeastern Lake Ontario-Lake Ontario-St. Lawrence
- [ ] All codes

Question 49d5. 07 Upper Mississippi

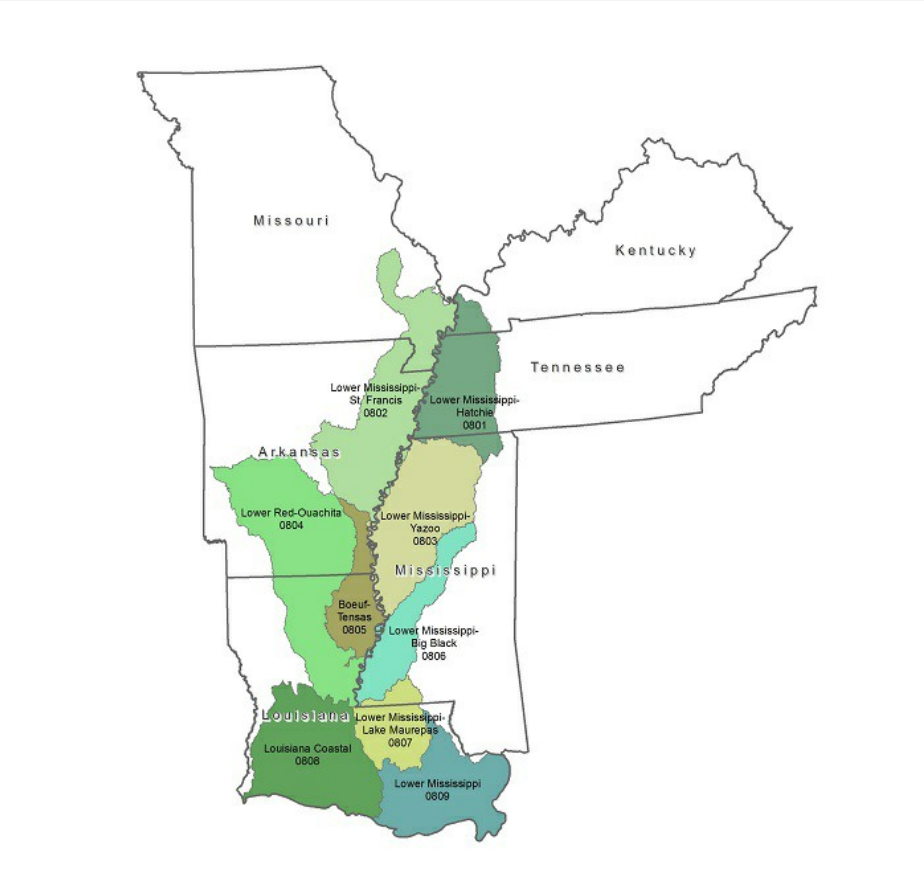
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0701 - Mississippi Headwaters
- [ ] 0702 - Minnesota
- [ ] 0703 - St. Croix
- [ ] 0704 - Upper Mississippi-Black-Root
- [ ] 0705 - Chippewa
- [ ] 0706 - Upper Mississippi-Maquoketa-Plum
- [ ] 0707 - Wisconsin
- [ ] 0708 - Upper Mississippi-Iowa-Skunk-Wapsipinicon
- [ ] 0709 - Rock
- [ ] 0710 - Des Moines
- [ ] 0711 - Upper Mississippi-Salt
- [ ] 0712 - Upper Illinois
- [ ] 0713 - Lower Illinois
- [ ] 0714 - Upper Mississippi-Kaskaskia-Meramec
- [ ] All codes

Question 49d6. 08 Lower Mississippi

Please select individual HUC-4 codes for your specific hydrologic units.

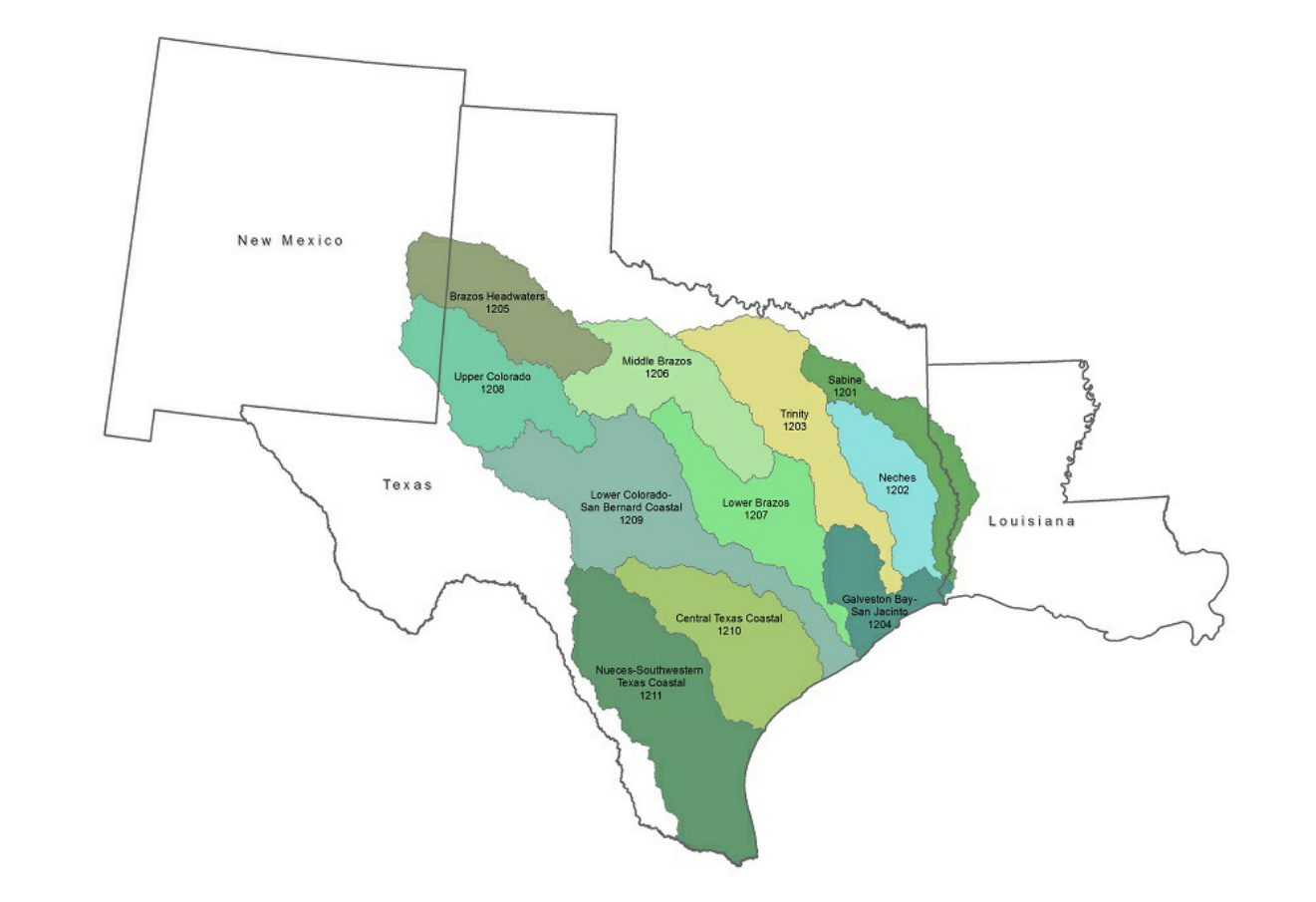


- [ ] 0801 - Lower Mississippi-Hatchie
- [ ] 0802 - Lower Mississippi-St. Francis
- [ ] 0806 - Lower Mississippi-Big Black
- [ ] 0807 - Lower Mississippi-Lake Maurepas

- [ ] 0803 - Lower Mississippi-Yazoo
- [ ] 0804 - Lower Red-Ouachita
- [ ] 0805 - Boeuf-Tensas
- [ ] 0808 - Louisiana Coastal
- [ ] 0809 - Lower Mississippi
- [ ] All codes

Question 49d7. 12 Texas – Gulf

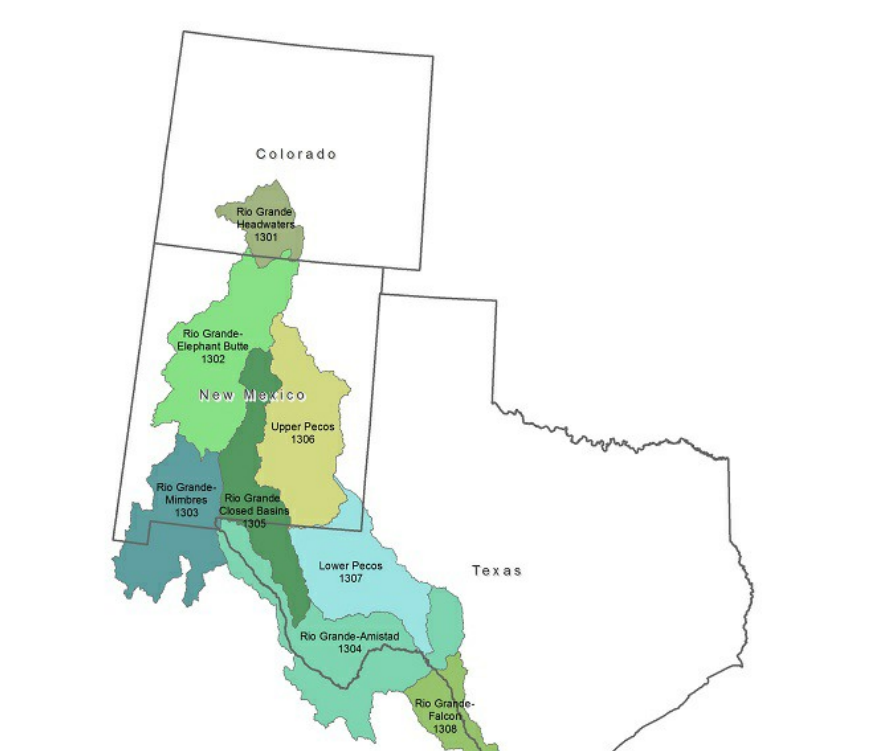
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1201 - Sabine
- [ ] 1202 - Neches
- [ ] 1203 - Trinity
- [ ] 1204 - Galveston Bay-San Jacinto
- [ ] 1205 - Brazos Headwaters
- [ ] 1206 - Middle Brazos
- [ ] 1207 - Lower Brazos
- [ ] 1208 - Upper Colorado
- [ ] 1209 - Lower Colorado-San Bernard Coastal
- [ ] 1210 - Central Texas Coastal
- [ ] 1211 - Nueces-Southwestern Texas Coastal
- [ ] All codes

Question 49d8. 13 Rio Grande

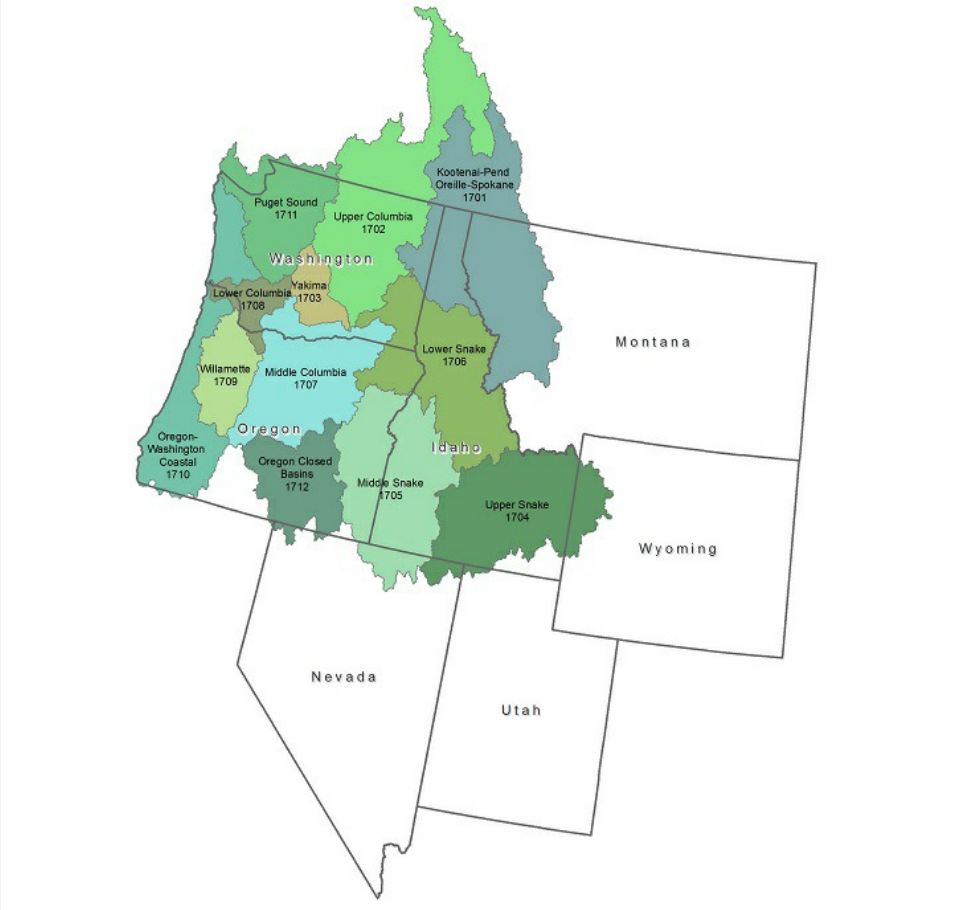
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1301 - Rio Grande Headwaters
- [ ] 1302 - Rio Grande-Elephant Butte
- [ ] 1303 - Rio Grande-Mimbres
- [ ] 1304 - Rio Grande-Amistad
- [ ] 1305 - Rio Grande Closed Basins
- [ ] 1306 - Upper Pecos
- [ ] 1307 - Lower Pecos
- [ ] 1308 - Rio Grande-Falcon
- [ ] 1309 - Lower Rio Grande
- [ ] All codes

Question 49d9. 17 Pacific Northwest

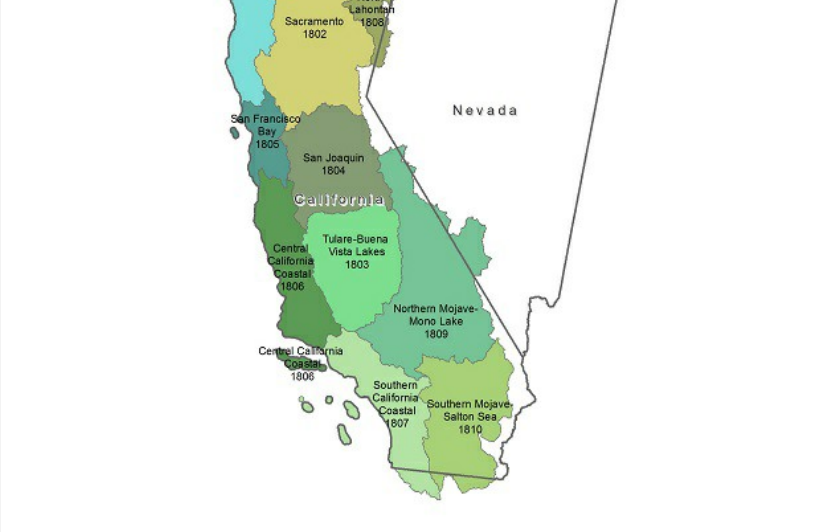
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1701 - Kootenai-Pend Oreille-Spokane
- [ ] 1702 - Upper Columbia
- [ ] 1703 - Yakima
- [ ] 1704 - Upper Snake
- [ ] 1705 - Middle Snake
- [ ] 1706 - Lower Snake
- [ ] 1707 - Middle Columbia
- [ ] 1708 - Lower Columbia
- [ ] 1709 - Willamette
- [ ] 1710 - Oregon-Washington Coastal
- [ ] 1711 - Puget Sound
- [ ] 1712 - Oregon Closed Basins
- [ ] All codes

Question 49d10. 18 California

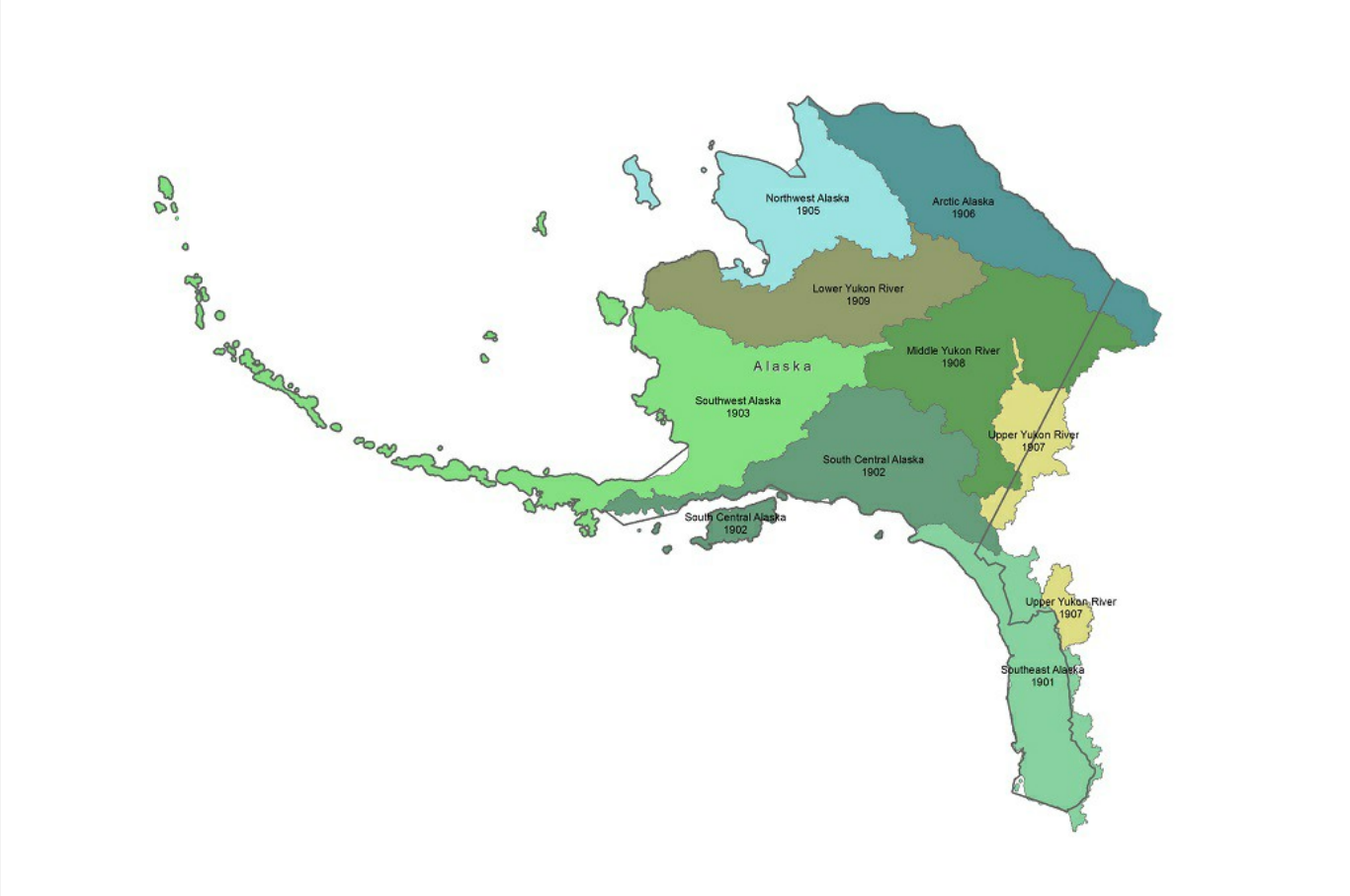
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1801 - Klamath-Northern California Coastal
- [ ] 1802 - Sacramento
- [ ] 1803 - Tulare-Buena Vista Lakes
- [ ] 1804 - San Joaquin
- [ ] 1805 - San Francisco Bay
- [ ] 1806 - Central California Coastal
- [ ] 1807 - Southern California Coastal
- [ ] 1808 - North Lahontan
- [ ] 1809 - Northern Mojave-Mono Lake
- [ ] 1810 - Southern Mojave-Salton Sea
- [ ] All codes

Question 49d11. 19 Alaska

Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1901 - Southeast Alaska
- [ ] 1902 - South Central Alaska
- [ ] 1903 - Southwest Alaska
- [ ] 1905 - Northwest Alaska
- [ ] 1906 - Arctic Alaska
- [ ] 1907 - Upper Yukon River
- [ ] 1908 - Middle Yukon River
- [ ] 1909 - Lower Yukon River
- [ ] All codes

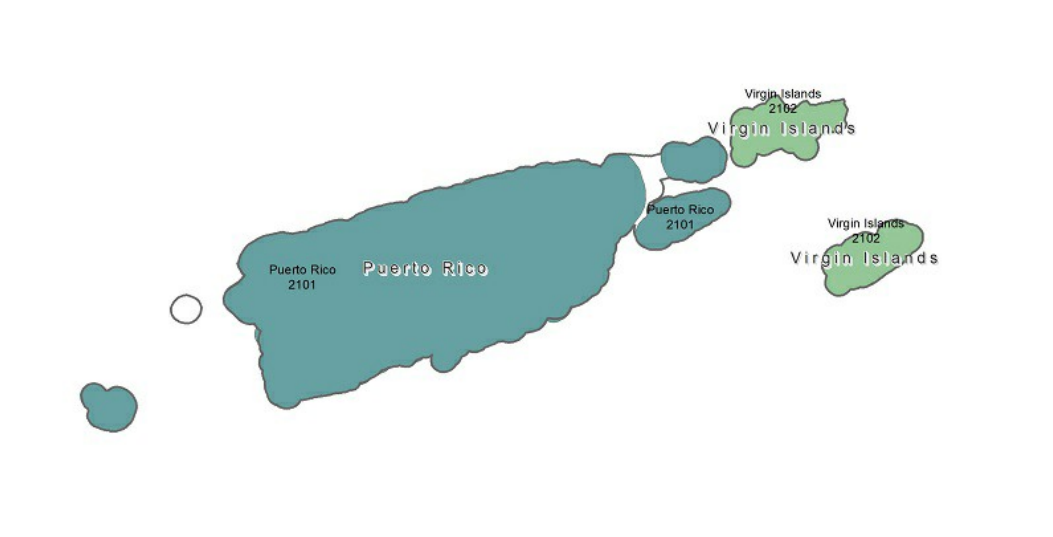
Question 49d12. 20 Hawai'i

Please select individual HUC-4 codes for your specific hydrologic units.

- [ ] 2001 - Hawai'i
- [ ] 2004 - Lana'i
- [ ] 2007 - Kaua'i
- [ ] 2002 - Maui
- [ ] 2005 - Moloka'i
- [ ] 2008 - Ni'ihau
- [ ] 2003 - Kaho'olawe
- [ ] 2006 - O'ahu
- [ ] All codes

Question 49d13. 21 Caribbean

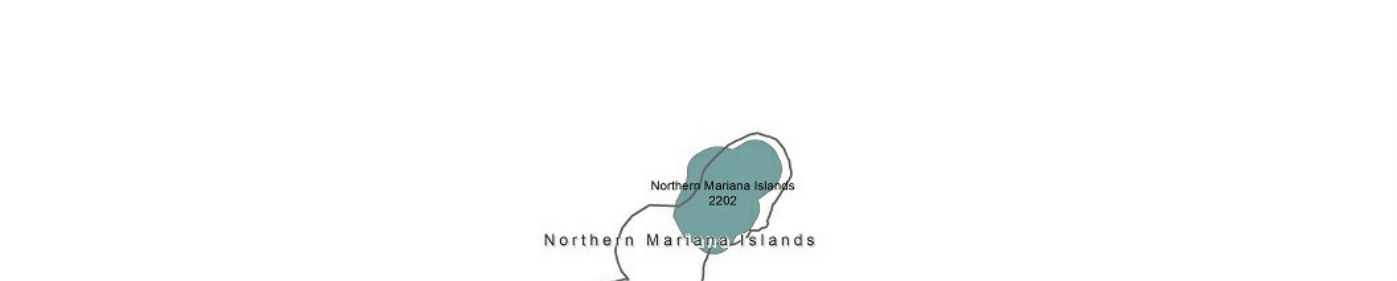
Please select individual HUC-4 codes for your specific hydrologic units.

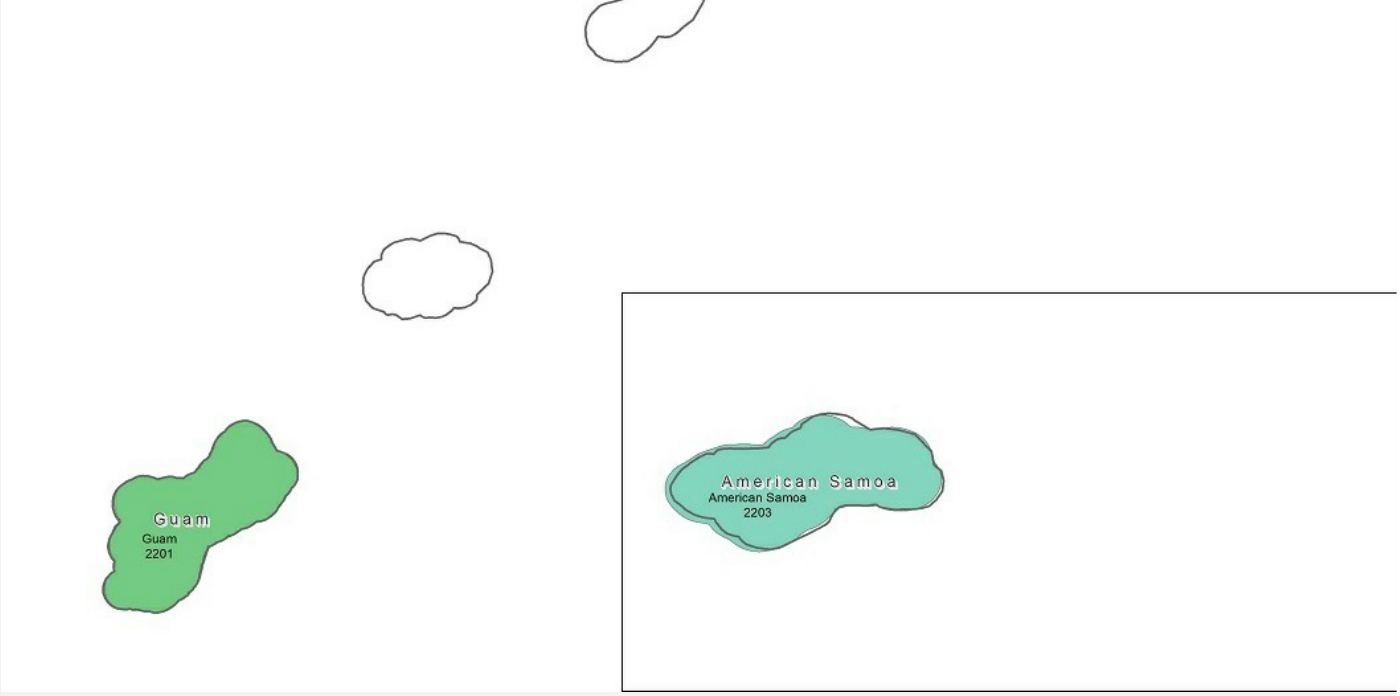


- [ ] 2101 - Puerto Rico
- [ ] 2102 - Virgin Islands
- [ ] All codes

Question 49d14. 22 Pacific Islands

Please select individual HUC-4 codes for your specific hydrologic units.





- [ ] 2201 - Guam
- [ ] 2202 - Northern Mariana Islands
- [ ] 2203 - American Samoa
- [ ] All codes

***Question 49e. If your geographic area requirements pertain to areas offshore (including the Great Lakes) of selected Federally-owned or Tribal lands, please designate below. Please select all that are required.**

- [ ] All Federally owned lands
- [ ] American Indian reservations, off-reservation trust lands, Alaska Native areas, and Hawaiian home lands
- [ ] Bureau of Land Management (BLM)
- [ ] Department of Defense (DOD)
- [ ] National Park Service (NPS)
- [ ] U.S. Forest Service (USFS)
- [ ] U.S. Fish and Wildlife Service (USFWS)
- [ ] Other (enter name and or description):

***Question 49f. If your offshore geographic area requirements pertain to marine sanctuaries and/or marine national monuments, please designate from the list below. Please select all that are required. See FAQ #26.**

- [ ] American Samoa
- [ ] Channel Islands
- [ ] Cordell Bank
- [ ] Florida Keys
- [ ] Flower Garden Banks
- [ ] Gray's Reef
- [ ] Greater Farallones
- [ ] Hawaiian Islands Humpback Whale
- [ ] Marianas Trench
- [ ] Monitor
- [ ] Monterey Bay
- [ ] Olympic Coast
- [ ] Papahanaumokuakea
- [ ] Rose Atoll
- [ ] Stellwagen Bank
- [ ] Thunder Bay
- [ ] All of the above

***Question 49g. If applicable, please submit your offshore geographic area requirements by emailing your shapefile(s), KML, or geodatabase to the project team at 3DNationStudy@usgs.gov and provide a unique filename that includes your organization and Mission Critical Activity, or abbreviations thereof (e.g., MN_DNR_stormwater_mgt or EPA_eBeaches). The projection and datum (.prj file) information must be included. Please enter the filename below. See FAQ #6.**

Question 50. What amount of horizontal error is acceptable in your offshore bathymetric data? In other words, what is the needed Total Horizontal Uncertainty (THU) of your offshore 3D bathymetric data at the 95% confidence level? Check one. See FAQ #21 for background information.

- ( ) Less than 50 cm
- ( ) Up to 1 meter
- ( ) Up to 2 meters
- ( ) Up to 5 meters
- ( ) Up to 10 meters
- ( ) Up to 20 meters

- Greater than 20 meters
- The best horizontal accuracy achievable for the vertical accuracy I need
- I don't know

Question 51. What amount of vertical error is acceptable in your offshore bathymetric data? In other words, what is the needed Total Vertical Uncertainty (TVU) of your offshore 3D bathymetric data at the 95% confidence level? Check one. See FAQ #22 for background information.

- Less than 1 meter
- Up to 2 meters
- Up to 5 meters
- Up to 10 meters
- Up to 20 meters
- Greater than 20 meters
- I don't know

Please be patient, this question can take up to 30 seconds to load.

Question 52a. For the offshore bathymetry portion of your Mission Critical Activity, does partial bottom coverage (e.g., transects) meet your requirements for offshore bathymetric data? Check one. See FAQ #10.

- Yes, for the entire Area of Interest for my Mission Critical Activity
- Yes, for part of my Area of Interest
- No, I need full bottom coverage of offshore bathymetric data

Question 52b. Please specify the vertical accuracy and longitudinal sampling density required for the transects. If your transect requirement is for a portion of the Area of Interest for your Mission Critical Activity, please also describe where you require transects.

***Question 52c. What International Hydrographic Organization (IHO) Order do you require for your Mission Critical Activity? Check one Order only, chosen from the table below. See FAQ #30.**

IHO Order	Special	1a	1b	2
Total Horizontal Uncertainty (THU) (95% Confidence Level)	2m	5m + 5% of depth	5m + 5% of depth	20m + 10% of depth
Total Vertical Uncertainty (TVU)[1] (95% Confidence Level)	a = 0.25m b = 0.0075	a = 0.5m b = 0.013	a = 0.5m b = 0.013	a = 1.0m b = 0.023
Full Seafloor Search	Required	Required	Not required	Not required
Feature Detection Capability	Cubic features > 1m	Cubic features > 2m in depths up to 40m; 10% of depth beyond 40m	Not applicable	Not applicable
Maximum Line Spacing	Not applicable, as 100% search is required	Not applicable, as 100% search is required	3 x average depth or 25m, whichever is greater	4 x average depth
Depth Examples (m)	TVU of submerged elevations at 95% Confidence Level (cm)			
0	25.0	50.0	50.0	100.0
10	26.1	51.7	51.7	102.6

20	29.2	56.4	56.4	110.1
Example Applications	Harbors, berthing areas, and associated critical channels where under-keel clearance is critical	Harbors, harbor approach channels, recommended tracks, and some coastal areas with depths up to 100 m where under-keel clearance is less critical but features of concern to surface shipping may exist	Areas shallower than 100 m where under-keel clearance is not considered to be an issue for the type of surface shipping expected to transit the area	Areas generally deeper than 100 m where a general description of the sea floor is considered adequate

[1] The formula below is to be used to compute, at the 95% confidence level, the maximum allowable TVU. The parameters "a" and "b" for each Order, together with the depth "d" are used to calculate the maximum allowable TVU for a specific depth:

Where: $\pm\sqrt{a^2 + (b \times d)^2}$

a represents that portion of the uncertainty that does not vary with depth

b is a coefficient which represents that portion of the uncertainty that varies with depth

d is the depth

b x d represents that portion of the uncertainty that varies with depth

- Special Order
- Order 1a
- Order 1b
- Order 2
- Coarser bathymetric data satisfies my needs
- I don't know
- I need higher quality data. Please describe:

*Question 53. For the offshore bathymetry portion of your Mission Critical Activity, how frequently do the offshore 3D bathymetric data need to be updated to satisfy your requirements? Stated another way, your Mission Critical Activity requires data no older than:_____. Please check one. See FAQ #12.

- Annually (one year)
- 2-3 years
- 4-5 years
- 6-10 years
- >10 years
- Event driven only – Data need to coincide with a specific event
- Other (please describe):

Question 54. For the offshore bathymetry portion of your Mission Critical Activity, do the International Hydrographic Organization (IHO) Order (or THU and TVU) and update frequency you just specified apply to the entire geographic Area of Interest you specified? An example might be someone who specified an Area of Interest as all U.S. waters, but whose requirements are for Special Order for ports and harbors, Order 1a for shipping channels, and Order 2 everywhere else, each updated every 5 years. Another example might be someone who specified an Area of Interest as all of the marine sanctuaries, but who requires Order 1a data updated every year for the Florida Keys and Order 1a data updated every 5 years for the remainder of the marine sanctuaries.

- Yes, my requirements apply to my entire Area of Interest
- No, my requirements vary across my Area of Interest. Please describe:

Question 55. Do you have a requirement for data to be tide corrected? Check one. See FAQ #28.

- No requirement for tide correction
- Tide correction using Mean High Water (MHW)
- Tide correction using Mean Sea Level (MSL)
- Tide correction using Mean Lower Low Water (MLLW)
- I don't know
- Tide correction using other datum (please describe):

Question 56a. For the Mission Critical Activity that you specified, please describe the importance of seamless integration within the offshore bathymetric data for your Area of Interest (AOI). For each type of data integration, identify how important it is that data are integrated across/between the different offshore bathymetric data collects that are often required to obtain bathymetric data for an entire AOI. Examples of data integration would be data collected at the same time (temporal integration) or data that spatially align between adjacent geographic areas (spatial integration). See FAQ #14.

Importance rating: Required; Highly desirable; Nice to have; Not required

	Seamless integration between offshore bathymetric data collections across your Area of Interest			
	Required	Highly desirable	Nice to have	Not required

Temporal Integration				
Entire AOI needs to be collected concurrently (i.e. in the same acquisition season/window)	○	○	○	○
Entire AOI needs to be collected under similar environmental conditions (e.g., similar low streamflow conditions, turbidity, or other weather conditions, etc.)	○	○	○	○
Other (please describe an	○	○	○	○
Spatial Integration				
Backscatter for entire AOI needs to be seamless (e.g., no cliffs or voids where datasets join)	○	○	○	○
Digital Terrain/Elevation Model for entire AOI needs to be seamless (e.g., no cliffs or voids where datasets join)	○	○	○	○
Other (please describe an	○	○	○	○

Question 56b. If you indicated you wanted seamless spatial integration of your offshore bathymetric data, what level of vertical manipulation are you willing to accept to achieve seamlessness? Check one. See FAQ #15 for background information.

- ○ Up to the required Total Vertical Uncertainty (TVU) at the 95% confidence level
- ○ Up to double the required TVU at the 95% confidence level
- ○ Up to triple the required TVU at the 95% confidence level
- ○ Whatever it takes to achieve seamlessness, including changes to the older, previously accepted dataset if it is proven to be less accurate than the newer
- ○ I don't know
- ○ Other (please describe):

Question 57. For the Mission Critical Activity that you specified, please describe the importance of the following offshore 3D bathymetric data products. For each data product, identify *how important* the 3D bathymetric data product is to your Mission Critical Activity. See FAQ #19.

Importance rating: Required; Highly desirable; Nice to have; Not required

	Required	Highly desirable	Nice to have	Not required
Data Products				
Digital Surface Model (DSM)	○	○	○	○
Digital Terrain Model (DTM)	○	○	○	○
Digital Elevation Model (DEM)	○	○	○	○
Raw point cloud data	○	○	○	○
Edited/cube XYZ	○	○	○	○
Full waveform	○	○	○	○
Bathymetric Attributed Grid (BAG)	○	○	○	○
National Vertical Datum Transformation Tool (V-Datum)	○	○	○	○
Tide Predictions	○	○	○	○
Tidal Constituent And Residual Interpolation (TCARI)	○	○	○	○
Sidescan imagery	○	○	○	○
Ground control/ground truthing	○	○	○	○
Other (please describe an	○	○	○	○

Question 58. For the Mission Critical Activity that you specified, please describe the importance of integrating your offshore 3D bathymetric data with other datasets. For each data type, identify *how important* the data integration is to your Mission Critical Activity. Examples of data integration would be data that align either spatially and/or temporally or attribute codes that are logically consistent. See FAQ #29.

Importance rating: Required; Highly desirable; Nice to have; Not required

	Required	Highly desirable	Nice to have	Not required
Data Type				
Hydrographic survey data	○	○	○	○
Nautical and/or navigation charts	○	○	○	○
Acoustic imagery of the seafloor	○	○	○	○
Aerial and/or satellite imagery	○	○	○	○
Underwater videography	○	○	○	○
Bottom texture	○	○	○	○
Bottom type - roughness and hardness, sediment type, density, grain size, color, contaminants, composition (organic, shell and mineral, sand percentage)	○	○	○	○
Submerged features - shipwrecks, archaeological sites, rock outcrops, debris, pipelines, cables, wellheads, piles	○	○	○	○
Subbottom characteristics	○	○	○	○
Geologic and/or seismic data	○	○	○	○
Water column properties - Physical properties	○	○	○	○
Water column properties - Chemical properties	○	○	○	○
Water column properties - Biological properties	○	○	○	○

Currents				
Tide heights, wave heights				
Sea ice conditions				
Habitat distribution and classification - submerged vegetation, seafloor-dwelling organisms, fish stocks				
Boundaries - Exclusive Economic Zone (EEZ), continental shelf, marine sanctuaries and parks, Coastal Barrier Resources System (CBRS), archaeological and historic properties, restricted areas				
Routes - shipping, ferries, other vessel traffic routes				
Offshore cadastral				
Lease areas - Outer Continental Shelf (OCS), oil and gas, or sand resource lease blocks; renewable energy leases; dredge areas				
Fixed obstructions - aids to navigation, beacons, landmarks, wind turbines, drilling platforms and equipment				
Floating observation and navigation systems - buoys, monitoring stations, etc.				
Land Use/ Land Cover				
Wetlands				
Estuaries				
Other (please describe an				

Question 59a. For the offshore bathymetry portion of your Mission Critical Activity, please tell us about the bathymetric data you are currently using. Please include information about its International Hydrographic Organization (IHO) Order (or THU and TVU) and date, if known. Please enter text. See FAQ #18 for information about how to identify available data.

Question 59b. For the offshore bathymetry portion of your Mission Critical Activity, please tell us where you access bathymetric data. Check all that apply. See FAQ #19.

- [ ] Digital Coast
- [ ] NOAA National Centers for Environmental Information (NCEI)
- [ ] NOAA nautical charts, including electronic charts
- [ ] USACE Inland Electronic Navigation Charts
- [ ] Marine Minerals Program GIS (MMP GIS)
- [ ] Other (please describe):

Question 59c. What benefits relative to your program are you now realizing from *currently available* offshore 3D bathymetric data? Check the option that most closely describes the benefits for each benefit type. See benefits example document for more information.

	Major	Moderate	Minor	None	Don't know
Current Benefits from existing offshore 3D bathymetric data					
Operational Benefits					
Time savings					
Cost savings or cost reduction (i.e. savings on purchases)					
Cost avoidance					
Increased revenues to the organization					
Mission-driven performance improvements					
Customer Service Benefits					
Value added to products or services					
Improved response or timeliness					
Improved customer experience					
Societal Benefits					
Education or outreach					
Environmental benefits					
Public safety, including life and property					
Other (please describe in your own words)					
Please describe					

Question 60. The following series of tables apply to the FUTURE benefits that your program would gain from offshore 3D bathymetric elevation data if ALL of the requirements you provided above could be met for the selected Mission Critical Activity. The future benefits are broken into three main categories: Operational, Customer Service, and Societal, and then into subcategories (e.g. Time savings, Cost Avoidance, etc). Each subcategory contains potential types of benefits. If you have another category and/or type of benefit not provided below, please write in your own response. See benefits example document for more information.

For each benefit type please indicate the following:

- Benefits your program is likely to receive - Select the option that most closely describes the magnitude of benefits your program is likely to receive for each benefit type, on a scale from 'None' to 'Major'. 'Don't know' is also an option.

- Quantification of Benefits - Please quantify any operational and/or customer service benefits you are likely to receive. Each benefit subcategory has its own quantification metric (e.g. Time Savings is type of hours saved (annual or monthly) and amount of those hours saved (e.g. 80)).

- Briefly Describe the Benefit

1. Briefly describe any major benefits. A few examples are provided as follows: fewer field visits would be required, or having authoritative data readily downloadable from a single site would save work hours, or we could perform more accurate and efficient modeling, or improved data would improve our ability to protect critical habitat areas.
2. For benefits you quantified, also briefly describe how you quantified the benefit. For example: fewer field visits would be required, 2 hours/field visit for 200 fewer field visits a year = 400 annual hours saved.

	Benefits your program is likely to receive					Hours Saved				Amount of Hours Saved	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D offshore bathymetric data											
Time Savings											
Hours saved from faster and/or avoided field visits/inspections.											
Hours saved through more efficient modeling, reviews, reporting, data dissemination, mapping, or other procedures											
Data manipulation reduced/avoided (e.g., combining data from multiple sources; changing projection, datum, etc.)											
Data errors reduced/avoided											
Hours saved through in-office project planning or monitoring											
Hours saved from more streamlined operations (e.g., permitting processes, offshore boundary determinations, etc.)											
Other (please describe)											

	Benefits your program is likely to receive					Dollars Saved				Amount of Dollars Saved	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual dollars saved	Monthly dollars saved	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D offshore bathymetric data											
Cost Savings or Cost Reduction (i.e. savings on purchases)											
Data acquisition costs saved, reduced or available to spend on other projects											
Materials saved (e.g., fertilizer, pesticides, water, irrigation systems, pond design, beach/dune restoration, building/construction materials, etc.)											
Other (please describe)											

	Benefits your program is likely to receive					Dollars Saved				Amount of Dollars Saved	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual dollars saved	Monthly dollars saved	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D offshore bathymetric data											
Cost Avoidance											
Data processing avoided (e.g., classifying point clouds, quality control, hydrotreatment, etc.)											
Data errors avoided											
Avoided loss of property due to natural hazards or disaster events											
Avoided accidents caused by human error due to lack of information (e.g. crashes, aviation incidents, marine accidents, oil spills)											
Other (please describe)											

	Benefits your program is likely to receive					Dollars Realized/Earned				Amount of Dollars Realized/Earned	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual dollars realized	Monthly dollars realized	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D offshore bathymetric data											
Increased Revenues to the Organization											
Improved harvest or extraction yields (e.g., timber, agriculture, fisheries, minerals, oil/gas, etc.)											
Increased cargo carrying capacity											
New products, services, or applications/apps sold											
Other (please describe)											

	Benefits your program is likely to receive					Improvement				Percent Improvement	Please describe briefly:
	Major	Moderate	Minor	None	Don't know	Annual Percent Improvement		I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D offshore bathymetric data											
Mission-driven Performance Improvements											
Increased program effectiveness											
Improved ability to carry out mission											
Improved decision making due to better data, modeling, etc.											
Other (please describe)											

	Benefits your program is likely to receive					Hours/Dollars Saved						Amount of Hours/Dollars Saved	Comments
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved	Monthly dollars saved	I don't know how to estimate	Unable to provide		
Future Operational Benefits from 3D offshore bathymetric data													
Please describe													

	Benefits your program is likely to receive					Hour/Dollar Benefits						Amount of Hours/Dollars Saved	Please
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved/dollars realized	Monthly dollars saved/dollars realized	I don't know how to estimate	Unable to provide		
Future Customer Service Benefits from 3D offshore bathyetric data													
Value Added to Products or Services (Benefits to the Customer/User)													
New products, services or applications/apps (e.g.,													

solar or green roof potential, GPS navigation, recreation opportunities, etc.)													
Improved accuracy of products or services (e.g. navigation charts, nautical charts, shoreline delineation, flood hazard maps, flood warnings, etc.)													
Other (please describe)													

	Benefits your program is likely to receive					Hour/Dollar Benefits						Amount of Hours/Dollars Saved	Please
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved/dollars realized	Monthly dollars saved/dollars realized	I don't know how to estimate	Unable to provide		
Future Customer Service Benefits from 3D offshore bathymetric data													
Improved Response or Timeliness (Benefits to the Customer/User)													
Faster reviews and approvals (e.g., permitting approval, EIS reviews, boundary determinations, etc.)													
Faster response to an incident or event (e.g., faster access to impacted areas, faster response and recovery operations, improved evacuation plans, etc.)													
Faster recovery after an event (e.g., faster port reopening after hurricane, faster identification of damaged structures, faster information about Advisory Base Flood Elevations, etc.)													
Improved customer assistance (e.g., use of data allows virtual view and support via phone, email, chat)													
More up to date services or products (e.g., nautical charts, navigation charts, flood hazard maps, etc.)													
Improved projections of at-risk locations and/or faster warning to the public of impending natural or man-made hazards (e.g., flood, fire, tsunami, active shooter, etc.)													
Other (please describe)													

	Benefits your program is likely to receive					Hour/Dollar Benefits						Amount of Hours/Dollars Saved	Please
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved/dollars realized	Monthly dollars saved/dollars realized	I don't know how to estimate	Unable to provide		
Future Customer Service Benefits from 3D offshore bathymetric data													
Improved Customer Experience													
Increased customer confidence in products or services													
New services, tools, or applications/apps													
Better data availability (faster downloads, data are all in one place, etc.)													

Other (please describe)													

	Benefits your program is likely to receive					Hour/Dollar Benefits						Amount of Hours/Dollars Saved	C
	Major	Moderate	Minor	None	Don't know	Annual hours saved	Monthly hours saved	Annual dollars saved/dollars realized	Monthly dollars saved/dollars realized	I don't know how to estimate	Unable to provide		
Future Customer Service Benefits from 3D offshore bathymetric data													
Other (please describe in your own words)													
Please describe													

	Benefits your program is likely to receive					Please describe in your own words:
	Major	Moderate	Minor	None	Don't know	
Future Societal Benefits from 3D offshore bathymetric data						
Societal Benefits						
Education or outreach						
Environmental benefits						
Public safety, including life and property						

	Benefits your program is likely to receive					Comments
	Major	Moderate	Minor	None	Don't know	
Future Societal Benefits from 3D offshore bathymetric data						
Other (please describe in your own words)						
Please describe						

Part 3.5 - Questions that apply to all geographic areas (inland, nearshore, and offshore)

Question 61a. For the Mission Critical Activity that you specified, please describe the importance of integration between the topographic, bathymetric, and/or topobathymetric datasets across your Area of Interest. For each type of integration, identify how important it is that data are integrated across/between the different topographic, bathymetric, and/or topobathymetric datasets that are required to obtain seamlessness across an entire AOI. Examples of data integration would be data that are collected at the same time (temporal integration) or data that spatially align across adjacent geographic areas (spatial integration). See FAQ #14.

Importance rating: Required; Highly desirable; Nice to have; Not required

	Seamless Integration between topographic, bathymetric, and/or topobathymetric dataset(s) across Area of Interest			
	Required	Highly desirable	Nice to have	Not required
Temporal Integration				
Entire AOI needs to be collected concurrently (i.e. in the same acquisition season/window)	○	○	○	○
Entire AOI needs to be collected under similar environmental conditions (e.g., similar low streamflow, turbidity, other weather conditions, leaf off, leaf on, etc.)	○	○	○	○
Other (please describe an	○	○	○	○
Spatial Integration				
Point Cloud or backscatter for entire AOI needs to be seamless (e.g., no obvious cliffs or voids where datasets join)	○	○	○	○
Digital Terrain/Elevation Model for entire AOI needs to be seamless (e.g., no cliffs or voids where datasets join)	○	○	○	○
Other (please describe an	○	○	○	○

Question 61b. If you indicated you wanted seamless spatial integration between topographic, bathymetric, and/or topobathymetric dataset(s) across your Area of Interest, what level of vertical manipulation are you willing to accept to achieve seamlessness? Check one. See FAQ #15 for background information.

- ○ Up to the required Total Vertical Uncertainty (TVU) at the 95% confidence level
- ○ Up to double the required TVU at the 95% confidence level
- ○ Up to triple the required TVU at the 95% confidence level
- ○ Whatever it takes to achieve seamlessness, including changes to the older, previously accepted dataset if it is proven to be less accurate than the newer
- ○ I don't know
- ○ Other (please describe):

Question 62a. For the Mission Critical Activity that you specified, please describe the importance of having 3D elevation data archived/stored in such a way that it is freely available for the public to find, get, and use it. Check one.

- ○ Required
- ○ Highly desirable
- ○ Nice to have
- ○ Not required

Question 62b. For the Mission Critical Activity that you specified, if you purchase or acquire 3D elevation data, do you archive/store the data in such a way that it is freely available for the public to find, get, and use it? Check one.

- ○ Yes
- ○ Partially, some of my data are publicly available and some are restricted
- ○ No, I require my data to remain proprietary/my data are licensed
- ○ I do not purchase or acquire elevation data

Question 62c. For the Mission Critical Activity that you specified, if you purchase or acquire 3D elevation data, where do you archive/store your data? Check all that apply.

- ☐ On my own or my agency/organization's internal resources
- ☐ On my agency's enterprise geospatial system
- ☐ Submit to my state's data repository for use by others
- ☐ Submit to NOAA's National Center for Environmental Information (NCEI) for use by others
- ☐ Submit to USGS for use by others (e.g. via The National Map)
- ☐ Submit to Marine Cadastre for use by others
- ☐ Submit to NOAA Digital Coast for use by others
- ☐ Submit to a third party commercial cloud provider
- ☐ Other (please describe):

Question 63. For all applicable geographic areas of your Mission Critical Activity (i.e., inland, nearshore, and offshore), which of the following

derivatives do you need to be able to generate from 3D elevation data? Check all that apply. See FAQ #31.

	Inland Topo	Inland Bathy	Nearshore Bathy	Offshore Bathy
Required Data Derivatives				
Triangulated Irregular Network (TIN)	☐	☐	☐	☐
Contours	☐	☐	☐	☐
Hillshades	☐	☐	☐	☐
Slope maps	☐	☐	☐	☐
Aspect maps	☐	☐	☐	☐
Curvature maps	☐	☐	☐	☐
Cross sections	☐	☐	☐	☐
Height-Above-Ground maps	☐	☐	☐	☐
Viewshed maps	☐	☐	☐	☐
Hydrologic Flow Direction Grids	☐	☐	☐	☐
Hydrologic Flow Accumulation Grids	☐	☐	☐	☐
Hydrologic networks (e.g. streams, lakes)	☐	☐	☐	☐
Hydrologic Units (Watershed Boundaries) (e.g. surface water drainage to a point)	☐	☐	☐	☐
Building footprints	☐	☐	☐	☐
Breaklines for road edge-of-pavement	☐	☐	☐	☐
Rugosity/Surface Roughness	☐	☐	☐	☐
Other (please describe):	☐	☐	☐	☐

Question 64. Which of these aspects of your 3D elevation data requirements for this Mission Critical Activity is the most important? Please rank the options from most important (1) to least important (3).

Geographic coverage
Vertical accuracy
Update frequency

Question 65. For your Mission Critical Activity, please select your preferred data formats for 3D elevation data and mark those that are not required.

	Preferred	Not Required
Vector Data		
Open Geospatial Consortium (OGC) conformant (for example Geo Java Script Object Notation [GeoJSON], Geography Markup Language [GML])	○	○
Shapefile	○	○
File geodatabase	○	○
Electronic Navigation Chart (ENC)	○	○
Raster Data		
Georeferenced Tagged Image File Format (GeoTIFF)	○	○
Tagged Image File Format (TIFF)	○	○
Multiresolution Seamless Image Database (MrSID)	○	○
Georeferenced Portable Document Format (GeoPDF)	○	○
Portable Document Format (PDF)	○	○
Raster Nautical Chart (RNC)	○	○
Gridded Data		
Bathymetric Attributed Grid (BAG)	○	○
Georeferenced Tagged Image File Format (GeoTIFF)	○	○
American Standard Code for Information Interchange (ASCII)	○	○
ArcGrid	○	○
Network Common Data Form (NetCDF)	○	○
GridFloat	○	○
Erdas Imagine (IMG)	○	○
Digital Terrain Elevation Data (DTED)	○	○
Mass Points		
Laser (LAS/LAZ) format	○	○
American Standard Code for Information Interchange (ASCII)	○	○
Other		
Triangulated Irregular Network (TIN)	○	○

Other format (please desc		

Part 4: Information Access Methods/Final Comments

Question 66. For your Mission Critical Activity, please rate the importance of each data or web service access method using the following criteria: Required; Highly desirable; Nice to have; Not required

	Required	Highly desirable	Nice to have	Not required
Data or Service Access Method				
Web services to discover standard data products				
Web services to download standard data products				
Web services to create customized data products				
Web services to dynamically use data with client-based software (like a browser, GIS, or to feed other services)				
Web services to visualize cartographically rendered and symbolized 3D elevation data				
Web services that allow a combination of visualizations with other visualization services (mash-ups)				

Question 67. Are there additional aspects of acquiring or using 3D elevation data for your Mission Critical Activity for which you could use assistance? Check all that apply.

- [ ] Coordination on data acquisition
- [ ] Metadata creation
- [ ] Data archiving
- [ ] Converting between file formats (e.g. .img to GeoTIFF)
- [ ] Converting between projections (e.g. Geographic Coordinates to UTM)
- [ ] Converting between horizontal datums (e.g. NAD83 Datum to WGS84 Datum)
- [ ] Converting between vertical datums (e.g. NAVD88 to a tidal datum such as Mean Sea Level)
- [ ] Training
- [ ] Other (please describe):
- [ ] None of the above

Question 67a. Please specify what training assistance you could use.

Question 68. Please provide any final comments that you wish to make that were not covered in the questions asked above:

If you have additional Mission Critical Activities that require 3D elevation data, please use the same survey link provided to you and repeat the questionnaire for any additional Mission Critical Activities you have.

Thank you for responding to this 3D Nation Elevation Requirements and Benefits Study questionnaire. The information that you have provided will be summarized for the Federal Agency, State, Territory, Tribe, or non-governmental organization that you represent. The Point of Contact for your organization will then have an opportunity to review and edit the summary requirements that will feed into the final 3D Nation study report. The final study report will be the primary source of information used to develop recommendations for a 3D Nation, which unites terrestrial and coastal/ocean mapping efforts from the highest mountains to the deepest oceans to ensure public access to an accurate, authoritative national elevation dataset. If you have any comments about the 3D Nation please contact Ashley Chappell at 3DNationStudy@usgs.gov.