3D Nation Requirements and Benefits Study

OMB Control Number: 0648-0762

Expiration Date: 05/31/2021

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 relates 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.

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995 unless the information collection has a currently valid OMB Control Number. The approved OMB Control Number for this information collection is 0648-0762. Without this approval, we could not conduct this survey/information collection. Public reporting for this information collection is estimated to be approximately 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. All responses to this information collection are voluntary. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden, to the NOAA Office of Coast Survey, attention Ashley Chappell (ashley.chappell@noaa.gov or 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.

The 3D Nation Study

We would like to thank you in advance for participating in the 3D Nation 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.
  - We do not recommend taking the survey on a mobile device.
  - Hitting the Enter key in an open text box submits the survey and brings you back to the survey start page; instead, provide input and then move to the next question or hit Save or Next.
  - 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.

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 name (Last, First).

***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 six 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

***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.**

Select:

***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.**

Select:

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

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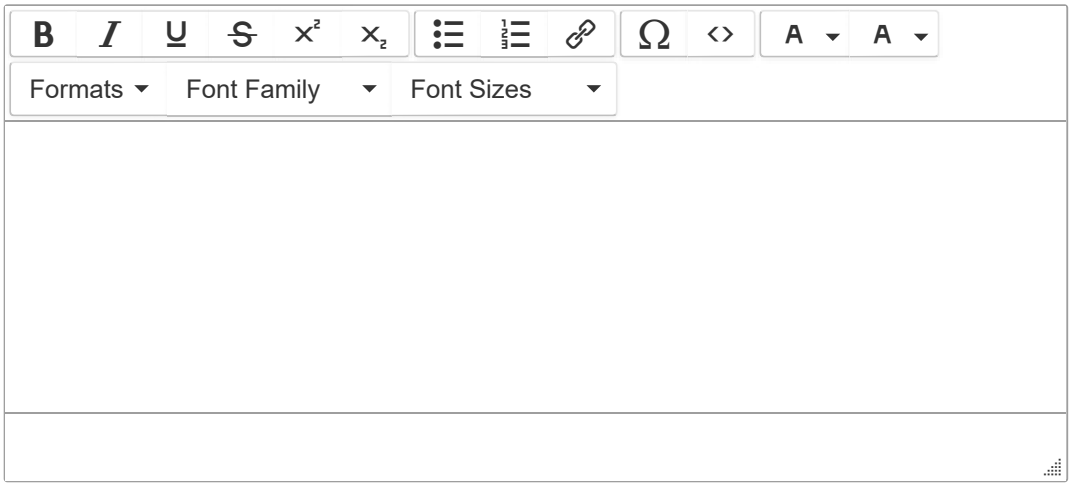
Part 2: Mission Critical Activity, Business Use, and Program Name

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: Coastal Zone Management.

***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 your primary 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 additional 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.**

You will be allowed to select additional Mission Critical Activities after this primary section is completed. 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 additional Business Uses as secondary and tertiary. See FAQ #1.

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.
	Analysis of coastal erosion and inundation. Hurricane storm surge and wind damage

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	

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).**

Select:

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

- Yes
- No

Question 5c. What are your secondary and tertiary Business Uses?

Examples of Mission Critical Activities that correlate with these Business Uses are provided below. If your Mission Critical Activity supports multiple Business Uses, you may designate additional Business Uses as secondary and tertiary. See FAQ #1.

Business Uses	2	3
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, Planning, and Response		
BU 18 - Homeland Security, Law Enforcement, Disaster Response, and Emergency Management		
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, Banking, Mortgage, and Insurance	○	○
BU 26 - Education K-12 and Beyond, Basic Research	○	○
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.

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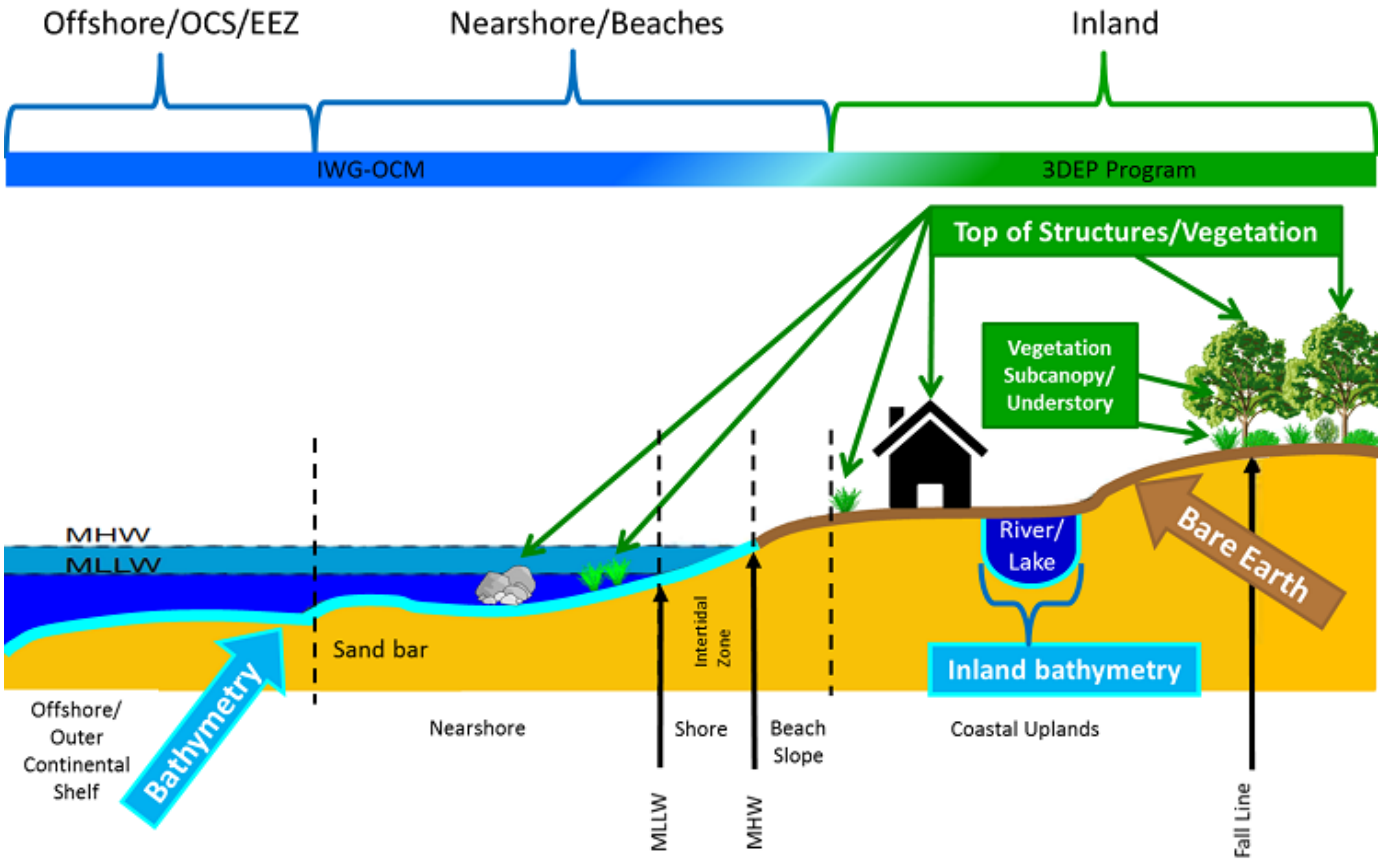
Question 6a. What is the total annual program budget supported by this Mission Critical Activity? Must be a US dollar amount (e.g., $500 or 1,000,000).

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
- [ ] Inland waters (i.e. inland bathymetry)
- [ ] Nearshore/Beaches (including Great Lakes) (i.e. topobathy and/or nearshore bathymetry)
- [ ] Offshore/Outer Continental Shelf/Exclusive Economic Zone (EEZ) (including Great Lakes) (i.e. bathymetry)

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: 1) Required, 2) Highly desirable, 3) Nice to have, 4) 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 specify and rat	○	○	○	○

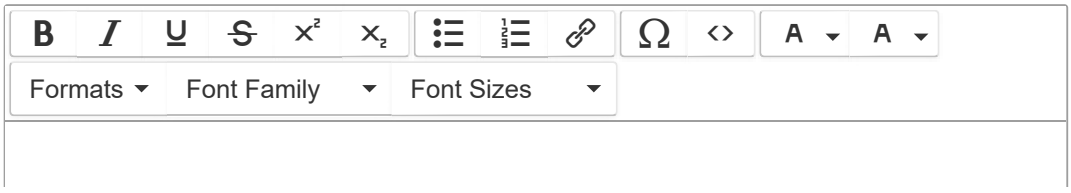
Question 9. For the Mission Critical Activity you specified, what is the average geographic extent of the area you work with on a day-to-day basis? Please select one.

- ○ 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 specify):

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 specify):

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



Part 3.1 - Questions for Inland Topography Requirements

***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
- ☐ 48 conterminous states plus (select all that apply):
- ☐ o Alaska
- ☐ o Hawai'i
- ☐ o American Samoa
- ☐ o Guam
- ☐ o Northern Mariana Islands
- ☐ o Federated States of Micronesia
- ☐ o Palau
- ☐ o Marshall Islands
- ☐ o U.S. Minor Outlying Islands (Baker Island, Howland Island, Jarvis Island, Johnston Island, Kingman Reef, Midway Islands, Navassa Island, Palmyra Atoll, and Wake Island)
- ☐ o Puerto Rico
- ☐ o U.S. Virgin Islands
- ☐ o 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
- [ ] Colorado
- [ ] Connecticut
- [ ] Delaware
- [ ] Federated States of Micronesia
- [ ] Florida
- [ ] Georgia
- [ ] Guam
- [ ] Hawai'i
- [ ] Idaho
- [ ] Illinois
- [ ] Indiana
- [ ] Iowa
- [ ] Kansas
- [ ] Kentucky
- [ ] Michigan
- [ ] Minnesota
- [ ] Mississippi
- [ ] Missouri
- [ ] Montana
- [ ] Nebraska
- [ ] Nevada
- [ ] New Hampshire
- [ ] New Jersey
- [ ] New Mexico
- [ ] New York
- [ ] North Carolina
- [ ] North Dakota
- [ ] Northern Mariana Islands
- [ ] Ohio
- [ ] 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 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).

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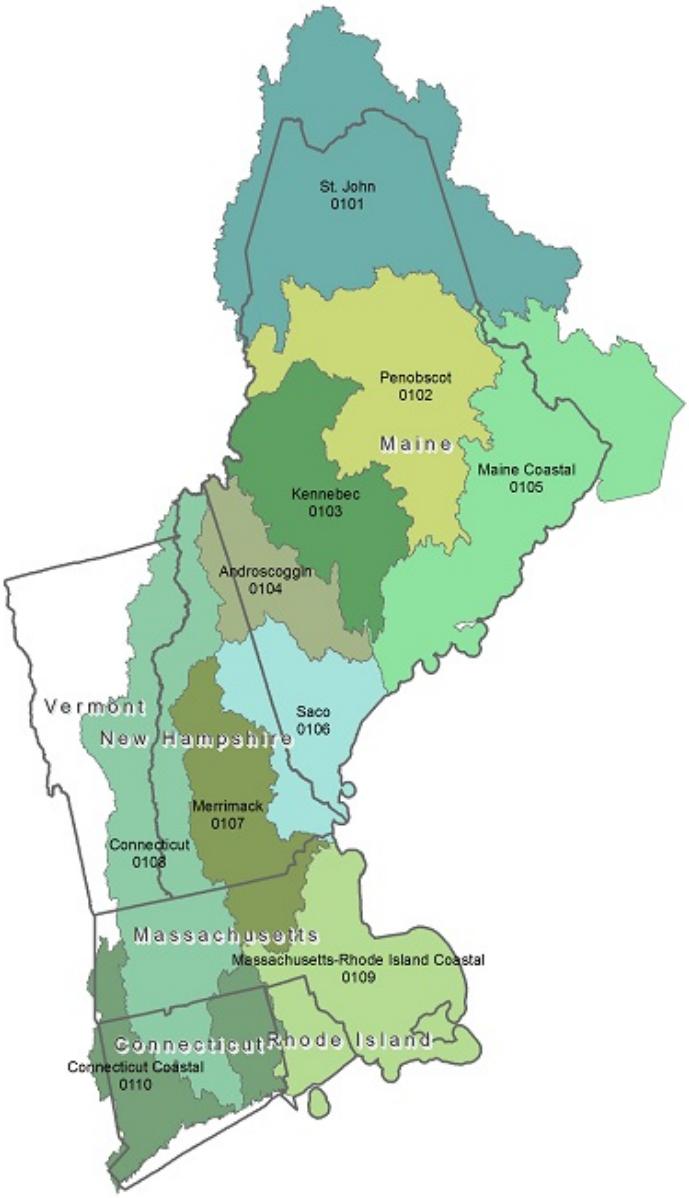
***Question 11c. If your geographic area requirements for inland topography pertain to hydrologic units (HUs), please check the appropriate hydrologic region(s) (2-digit HU) below. This will lead you to select individual 4-digit HUs nested within your hydrologic region. Please select all that are required.**

- [ ] 01 New England
- [ ] 02 Mid-Atlantic
- [ ] 03 South Atlantic-Gulf
- [ ] 04 Great Lakes
- [ ] 09 Souris-Red-Rainy
- [ ] 10 Missouri
- [ ] 11 Arkansas-White-Red
- [ ] 12 Texas – Gulf
- [ ] 17 Pacific Northwest
- [ ] 18 California
- [ ] 19 Alaska
- [ ] 20 Hawai'i

- [ ] 05 Ohio
- [ ] 06 Tennessee
- [ ] 07 Upper Mississippi
- [ ] 08 Lower Mississippi
- [ ] 13 Rio Grande
- [ ] 14 Upper Colorado
- [ ] 15 Lower Colorado
- [ ] 16 Great Basin
- [ ] 21 Caribbean
- [ ] 22 Pacific Islands

Question 11c1. 01 New England

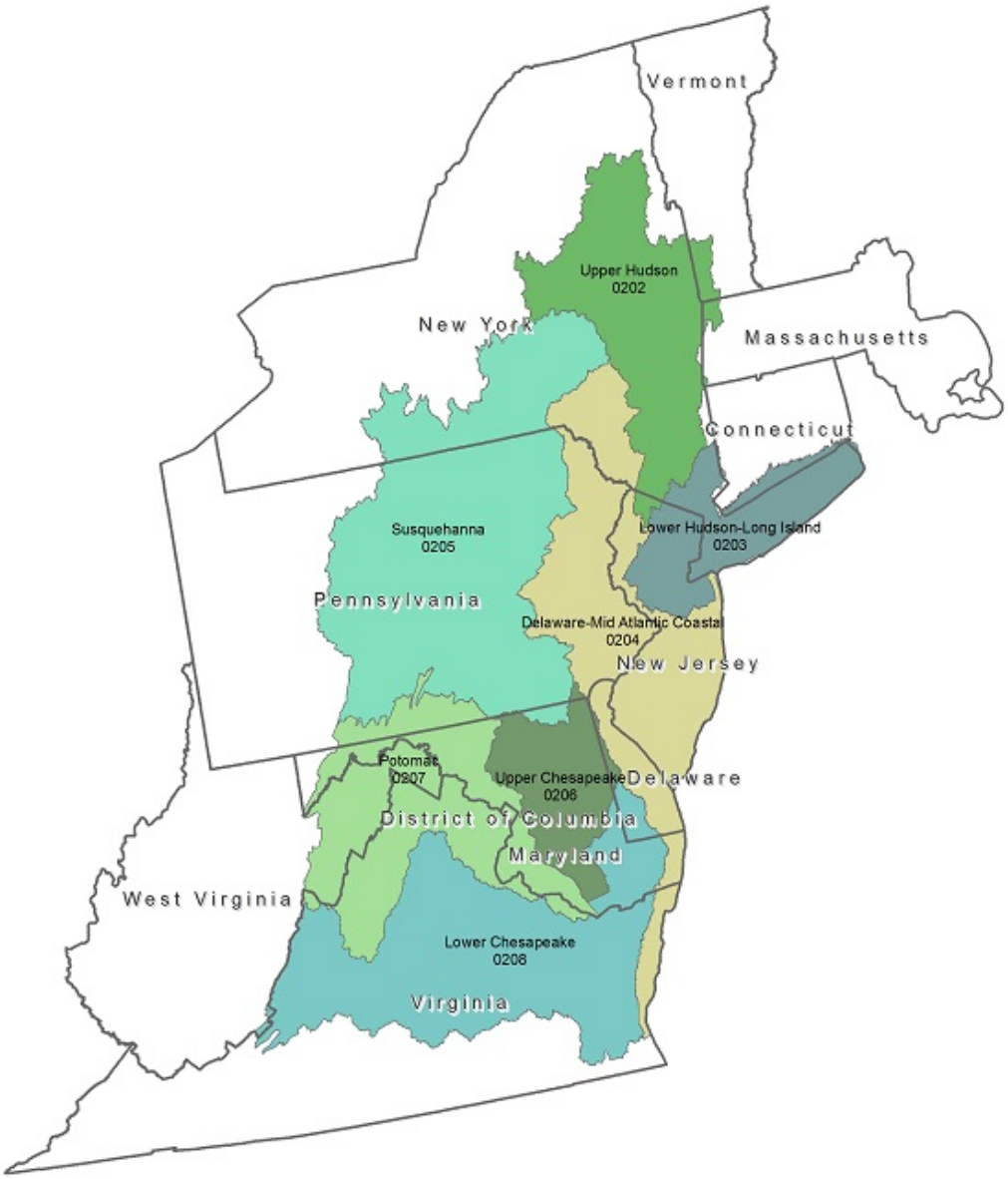
Please select individual HUC-4 codes for your specific hydrologic units.



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

Question 11c2. 02 Mid-Atlantic

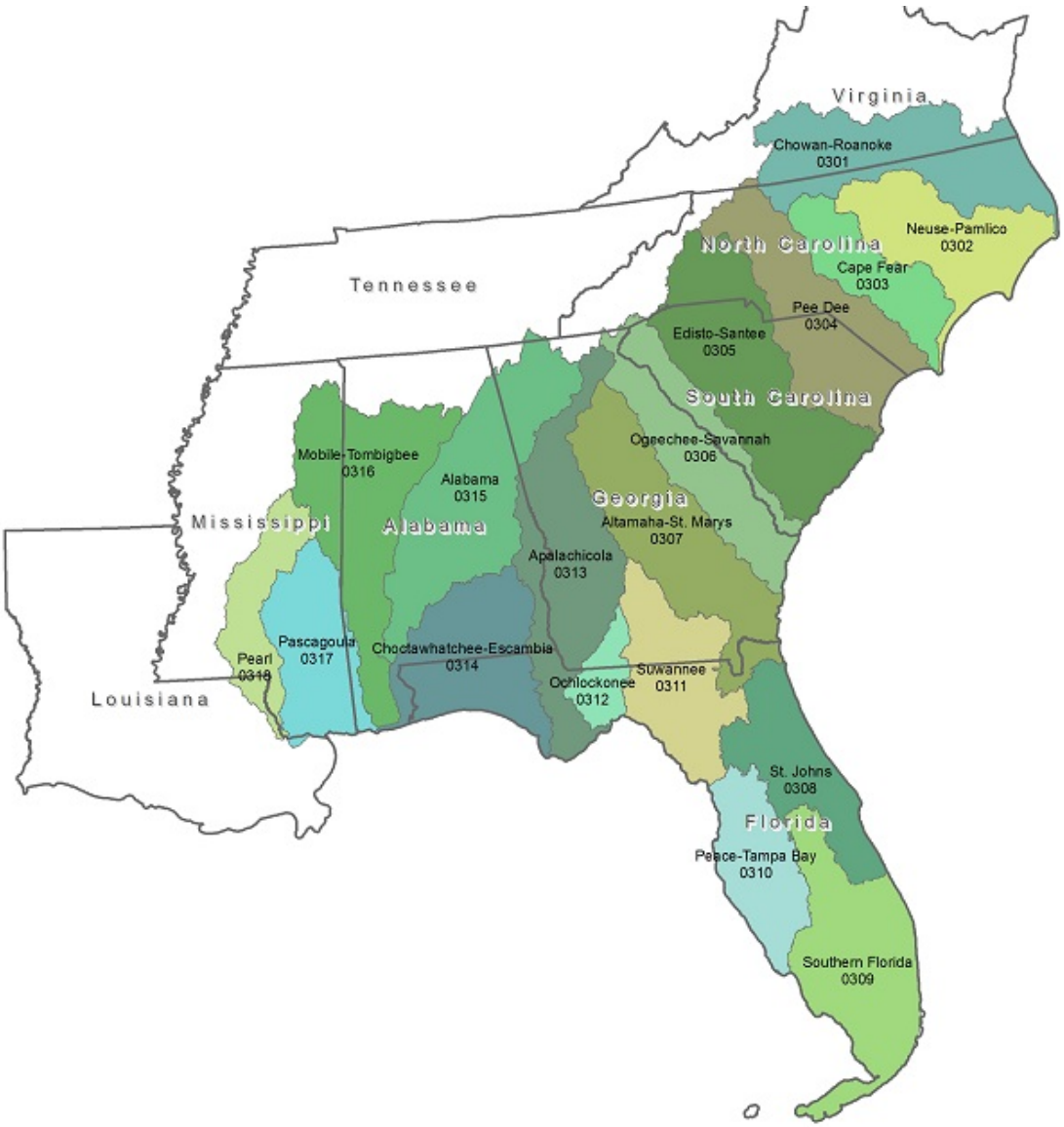
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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

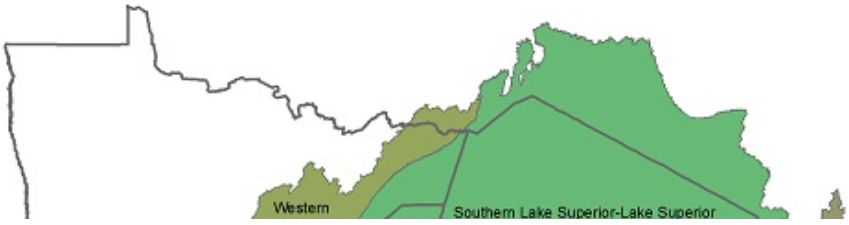
Please select individual HUC-4 codes for your specific hydrologic units.

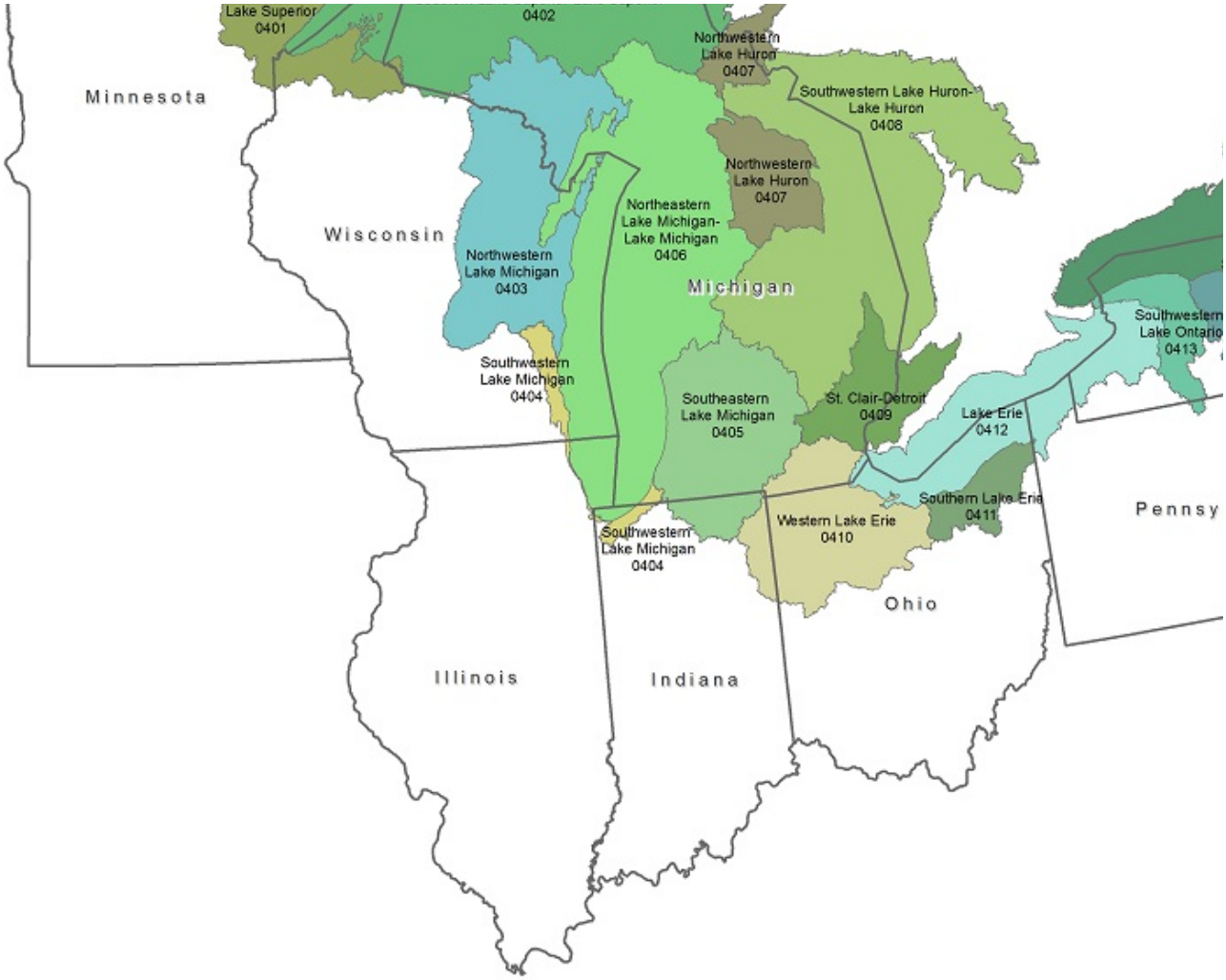


- [ ] 0301 - Chowan-Roanoke
- [ ] 0302 - Neuse-Pamlico
- [ ] 0303 - Cape Fear
- [ ] 0304 - Pee Dee
- [ ] 0305 - Edisto-Santee
- [ ] 0306 - Ogeechee-Savannah
- [ ] 0307 - Altamaha-St. Marys
- [ ] 0308 - St. Johns
- [ ] 0309 - Southern Florida
- [ ] 0310 - Peace-Tampa Bay
- [ ] 0311 - Suwannee
- [ ] 0312 - 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.

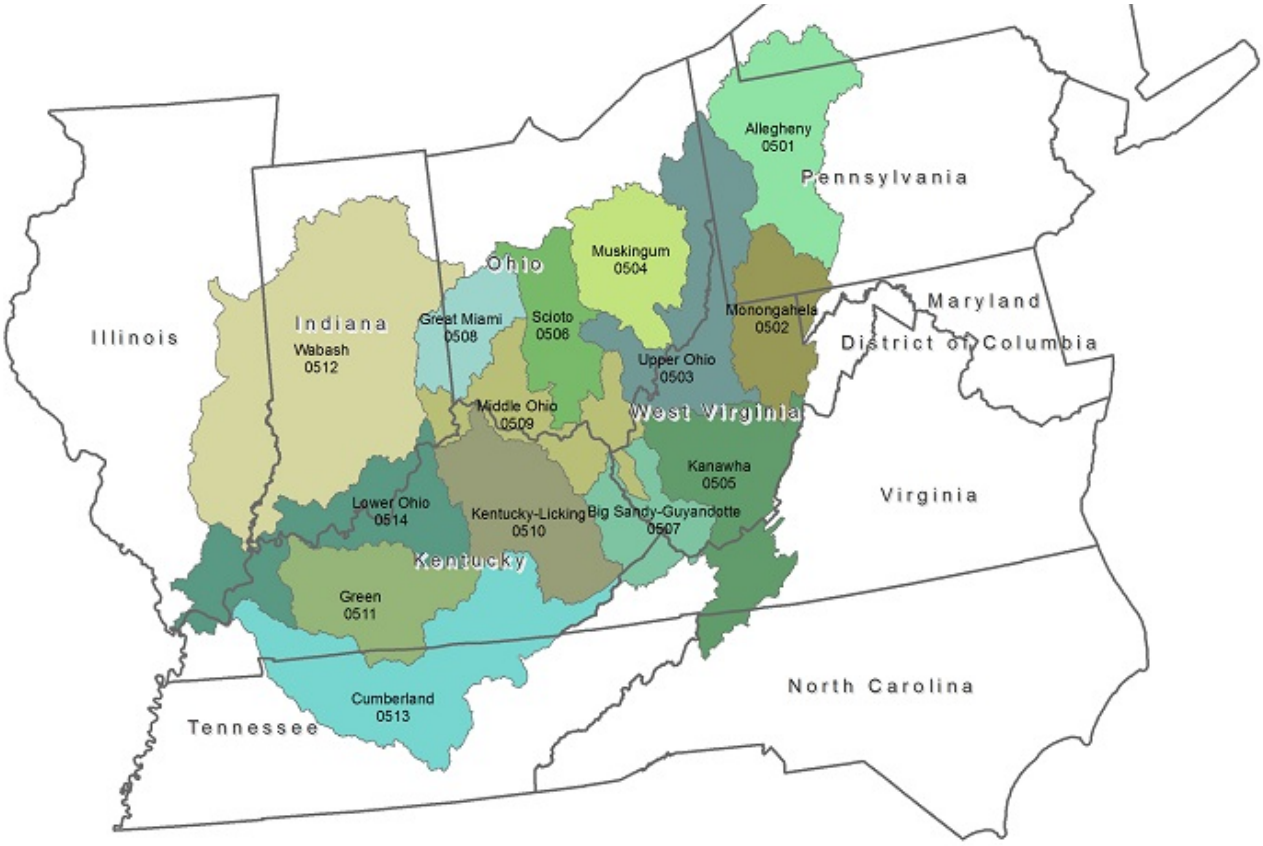




- [ ] 0401 - Western Lake Superior
- [ ] 0402 - Southern Lake Superior-Lake Superior
- [ ] 0403 - Northwestern Lake Michigan
- [ ] 0404 - Southwestern Lake Michigan
- [ ] 0405 - Southeastern Lake Michigan
- [ ] 0406 - Northeastern Lake Michigan-Lake Michigan
- [ ] 0407 - Northwestern Lake Huron
- [ ] 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

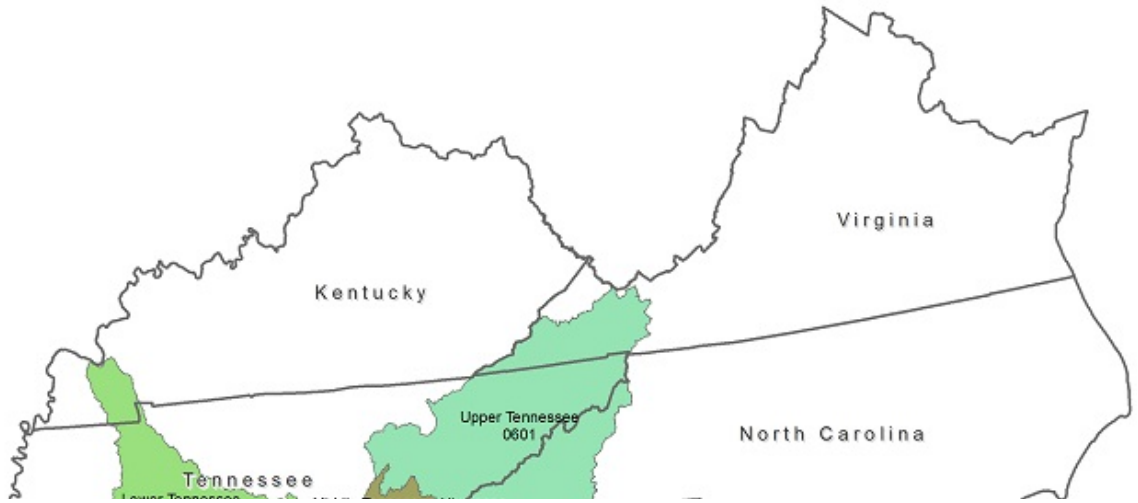
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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

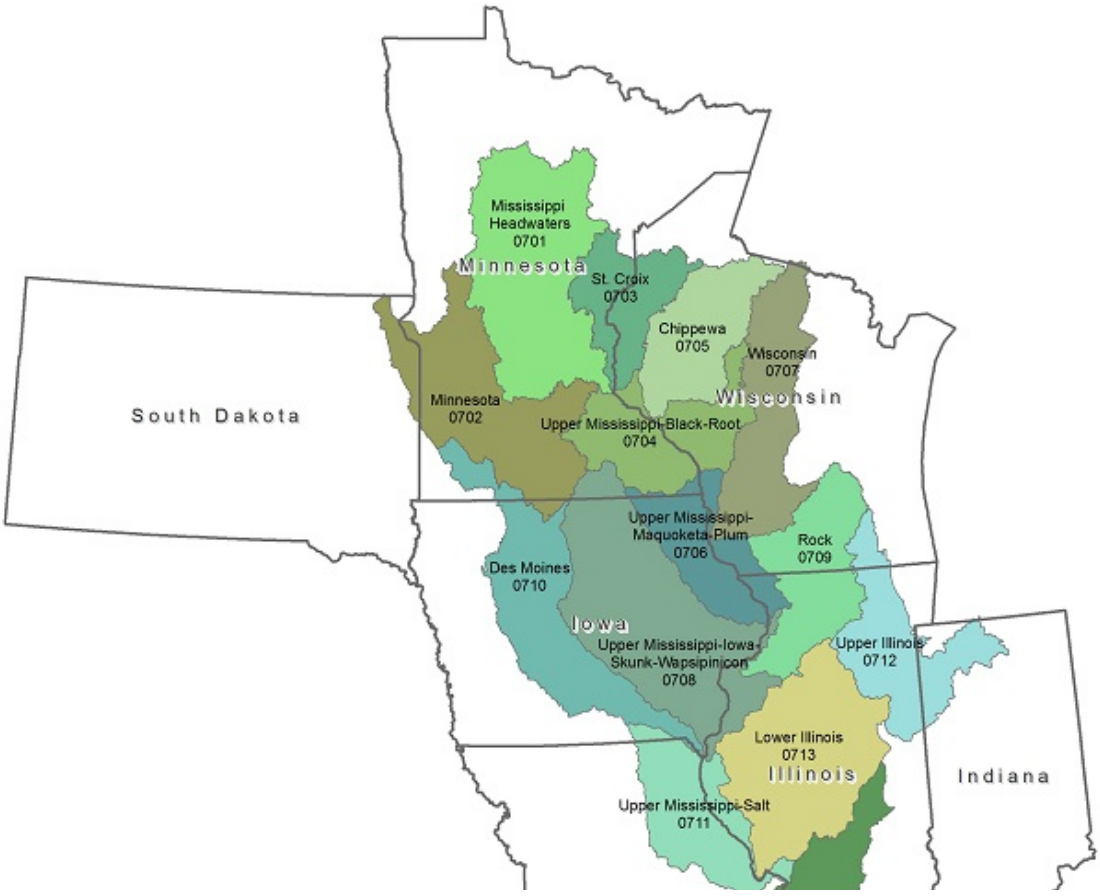
Please select individual HUC-4 codes for your specific hydrologic units.



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

Question 11c7. 07 Upper Mississippi

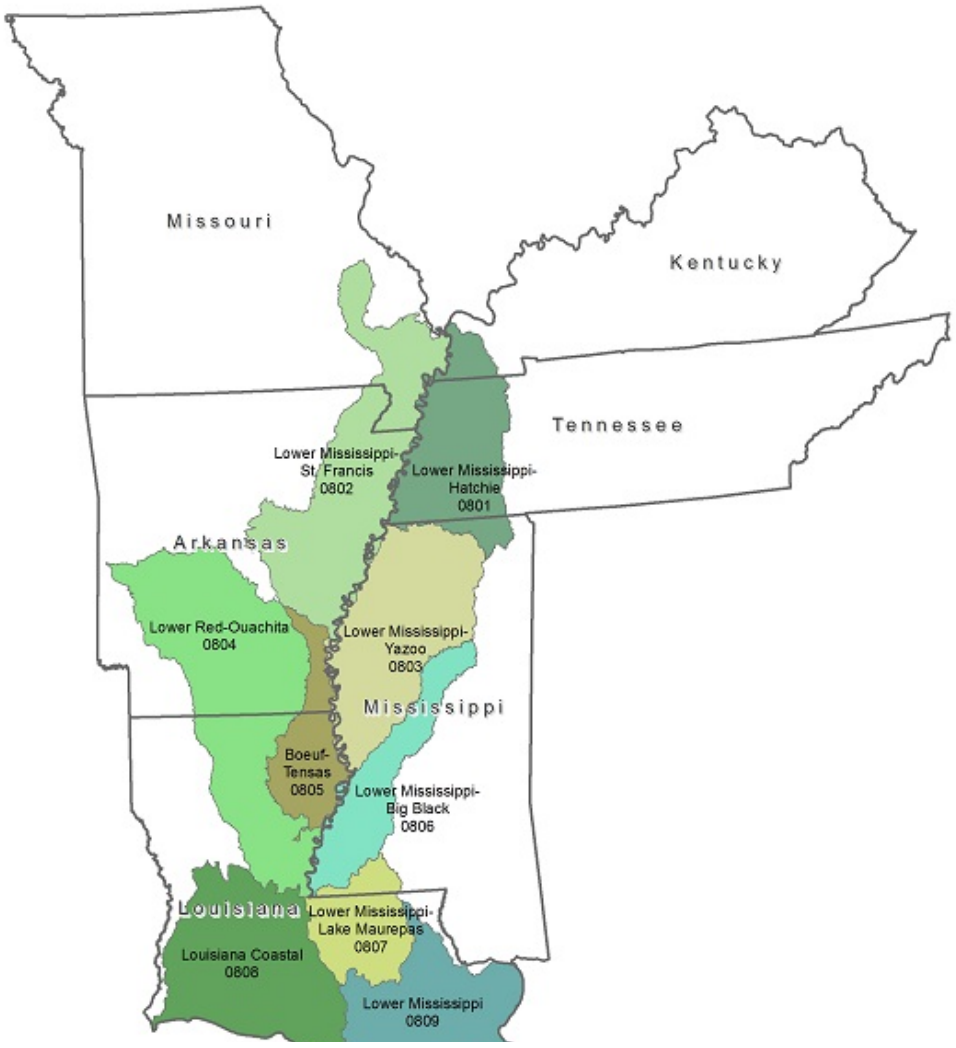
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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
- [ ] 0804 - Lower Red-Ouachita
- [ ] 0805 - Boeuf-Tensas
- [ ] 0806 - Lower Mississippi-Big Black
- [ ] 0807 - Lower Mississippi-Lake Maurepas
- [ ] 0808 - Louisiana Coastal
- [ ] 0809 - Lower Mississippi
- [ ] All codes

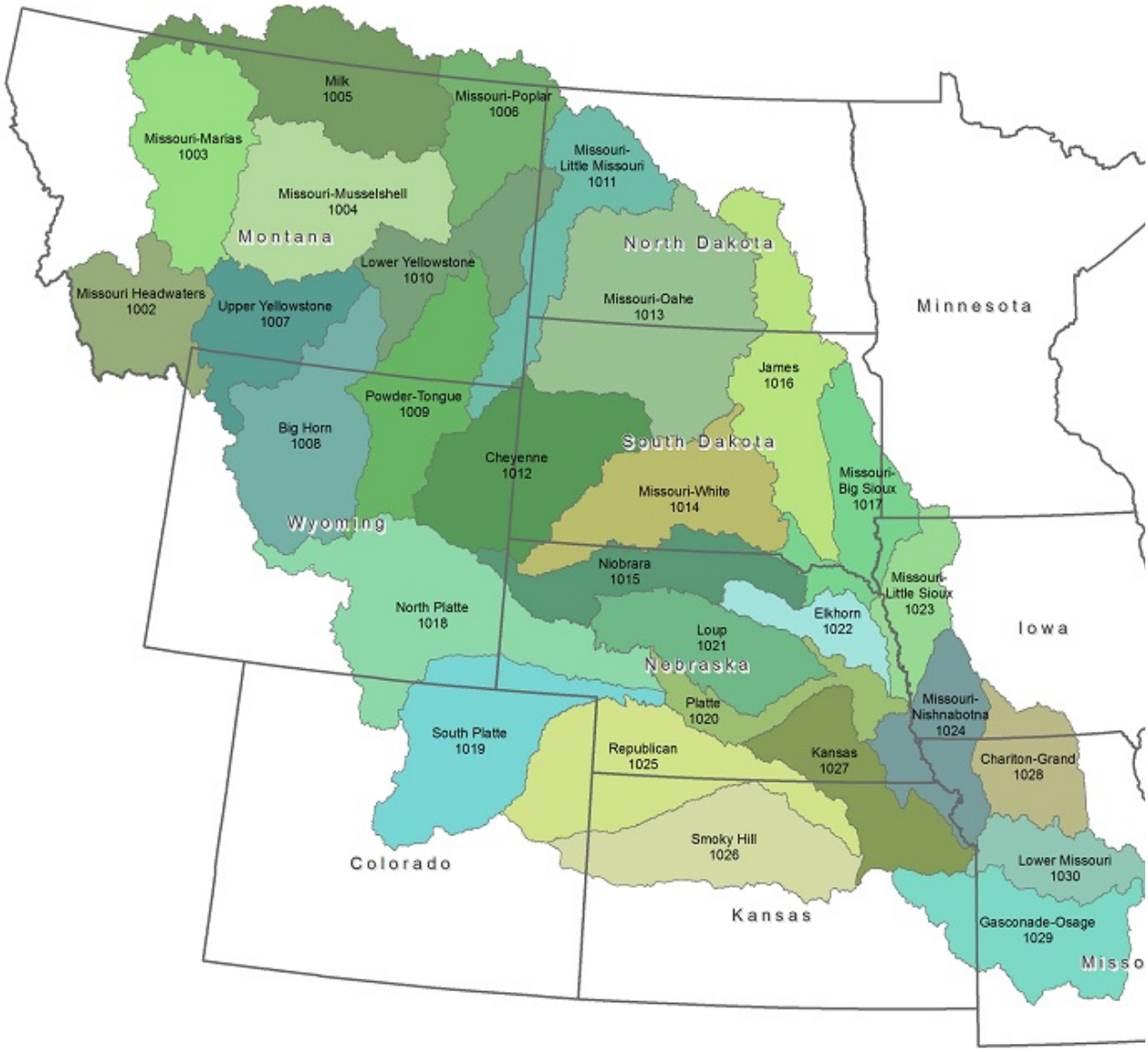
Question 11c9. 09 Souris-Red-Rainy

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

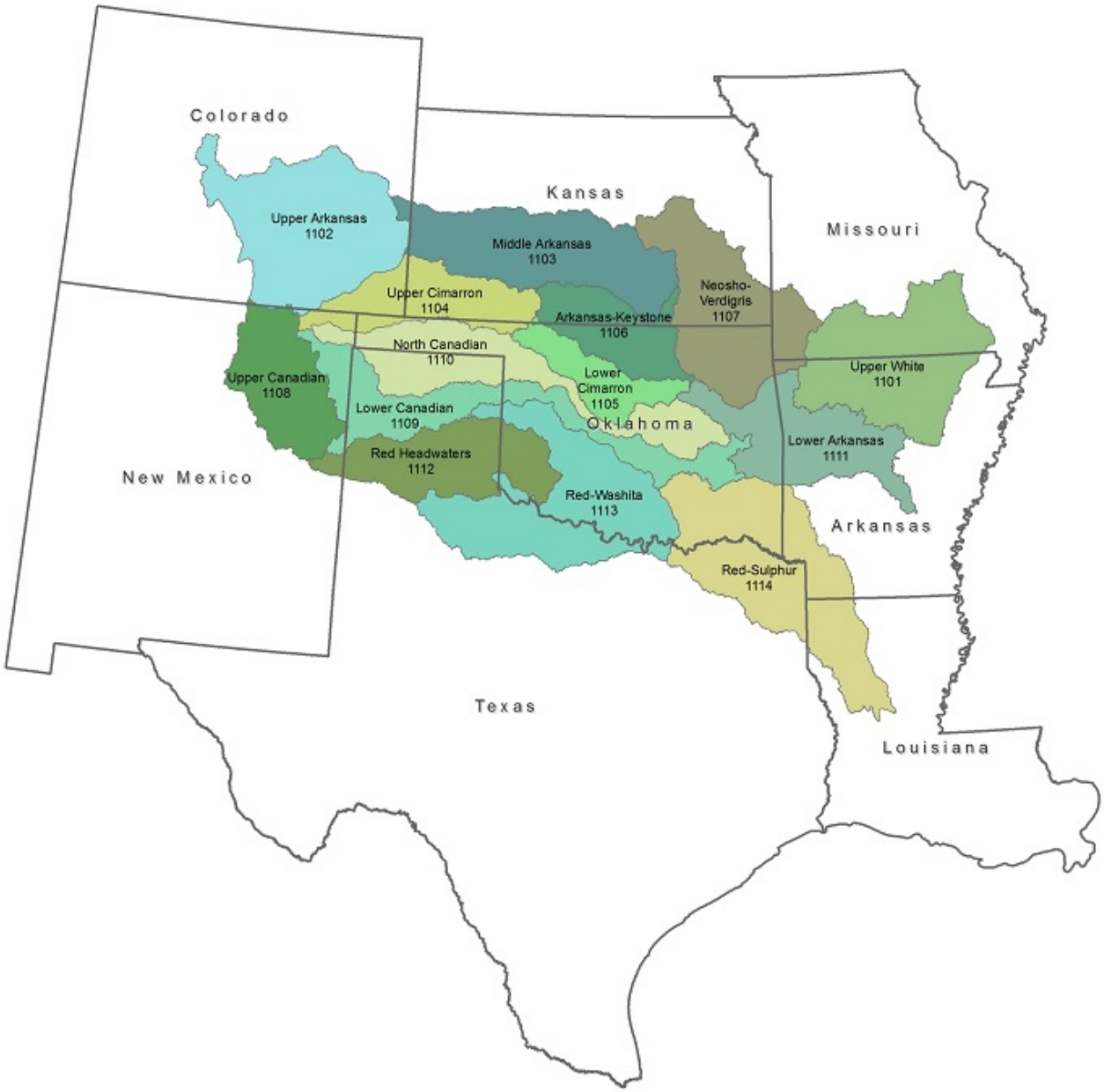
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1002 - Missouri Headwaters
- [ ] 1003 - Missouri-Marias
- [ ] 1004 - Missouri-Musselshell
- [ ] 1005 - Milk
- [ ] 1006 - Missouri-Poplar
- [ ] 1007 - Upper Yellowstone
- [ ] 1008 - Big Horn
- [ ] 1009 - Powder-Tongue
- [ ] 1010 - Lower Yellowstone
- [ ] 1011 - Missouri-Little Missouri
- [ ] 1012 - Cheyenne
- [ ] 1013 - Missouri-Oahe
- [ ] 1014 - Missouri-White
- [ ] 1015 - Niobrara
- [ ] 1016 - James
- [ ] 1017 - Missouri-Big Sioux
- [ ] 1018 - North Platte
- [ ] 1019 - South Platte
- [ ] 1020 - Platte
- [ ] 1021 - Loup
- [ ] 1022 - Elkhorn
- [ ] 1023 - Missouri-Little Sioux
- [ ] 1024 - Missouri-Nishnabotna
- [ ] 1025 - Republican
- [ ] 1026 - Smoky Hill
- [ ] 1027 - Kansas
- [ ] 1028 - Chariton-Grand
- [ ] 1029 - Gasconade-Osage
- [ ] 1030 - Lower Missouri
- [ ] All codes

Question 11c11. 11 Arkansas-White-Red

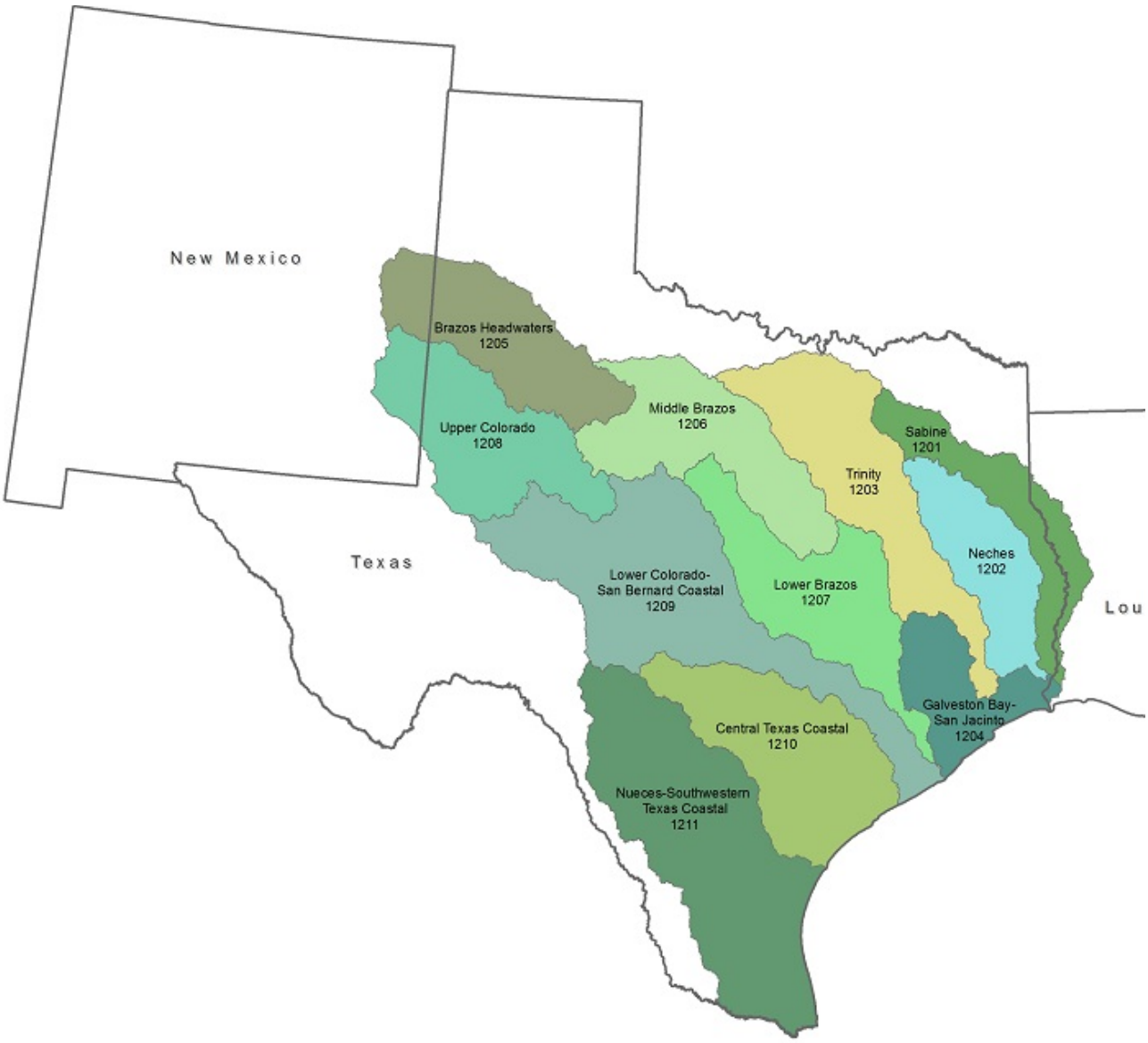
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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

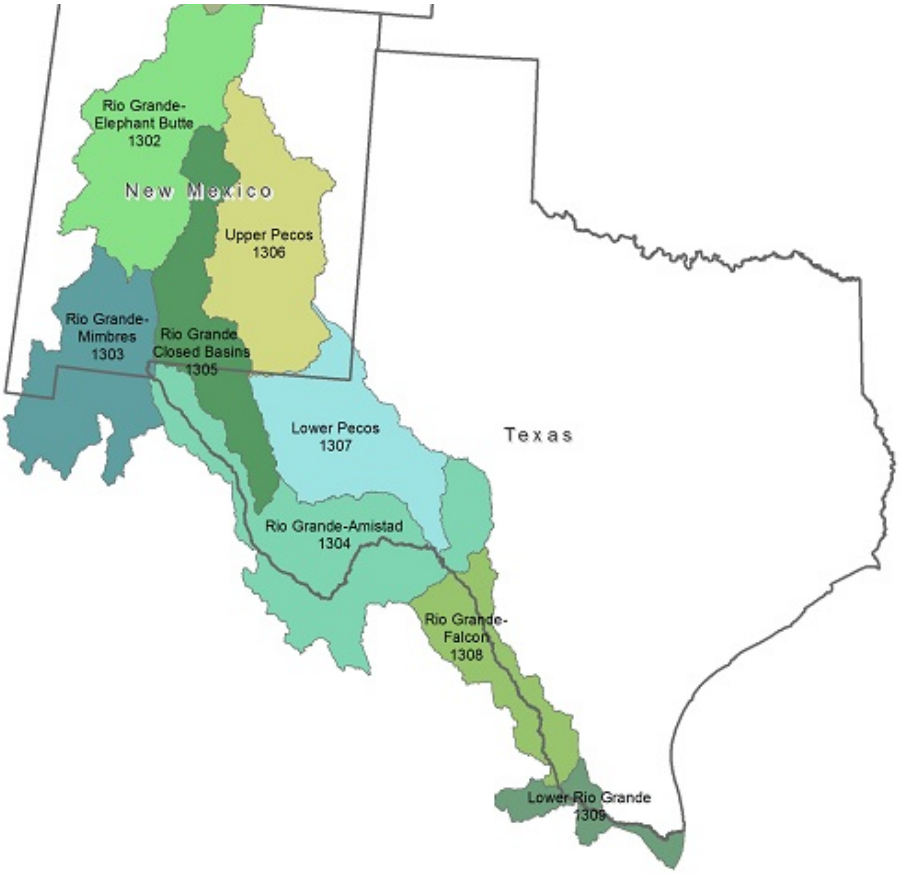
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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

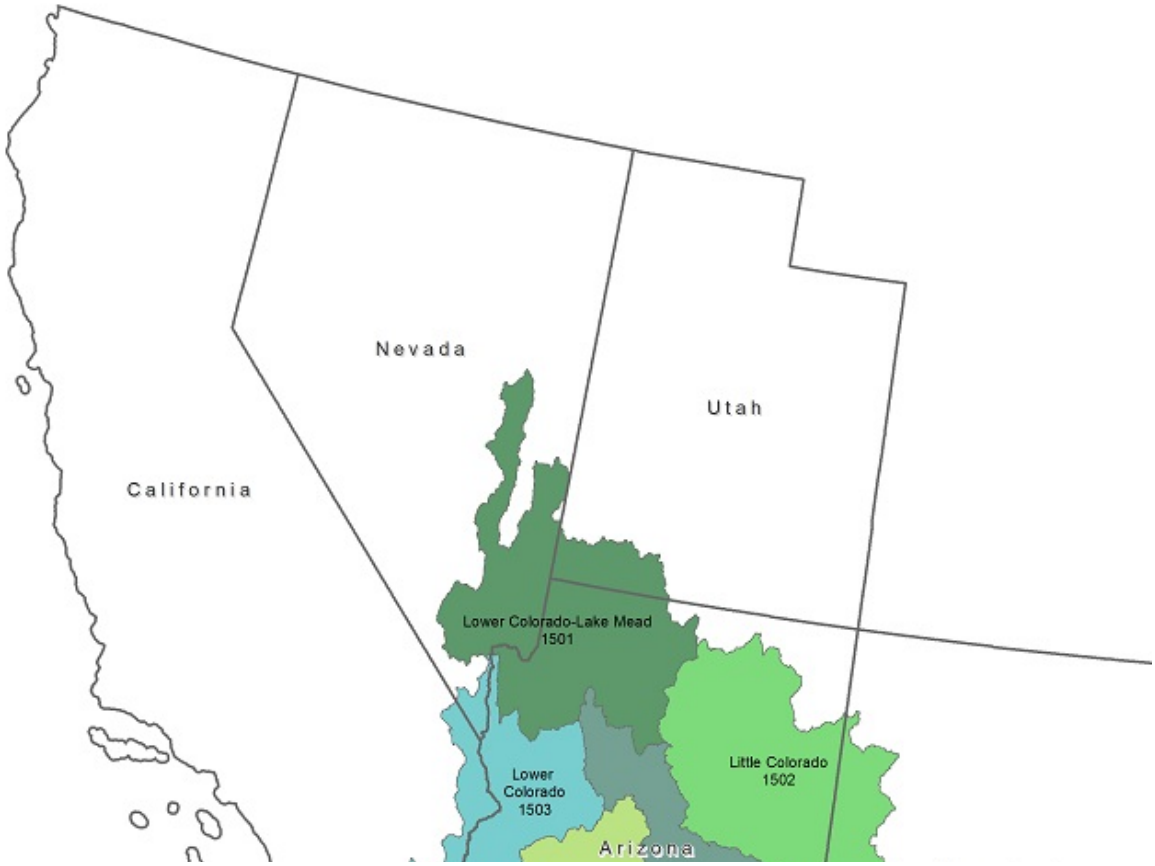
Question 11c14. 14 Upper Colorado

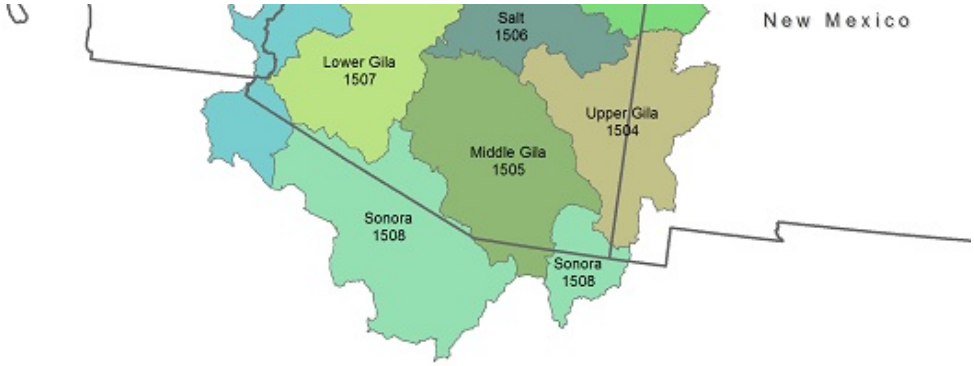
Please select individual HUC-4 codes for your specific hydrologic units.

- [ ] 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.

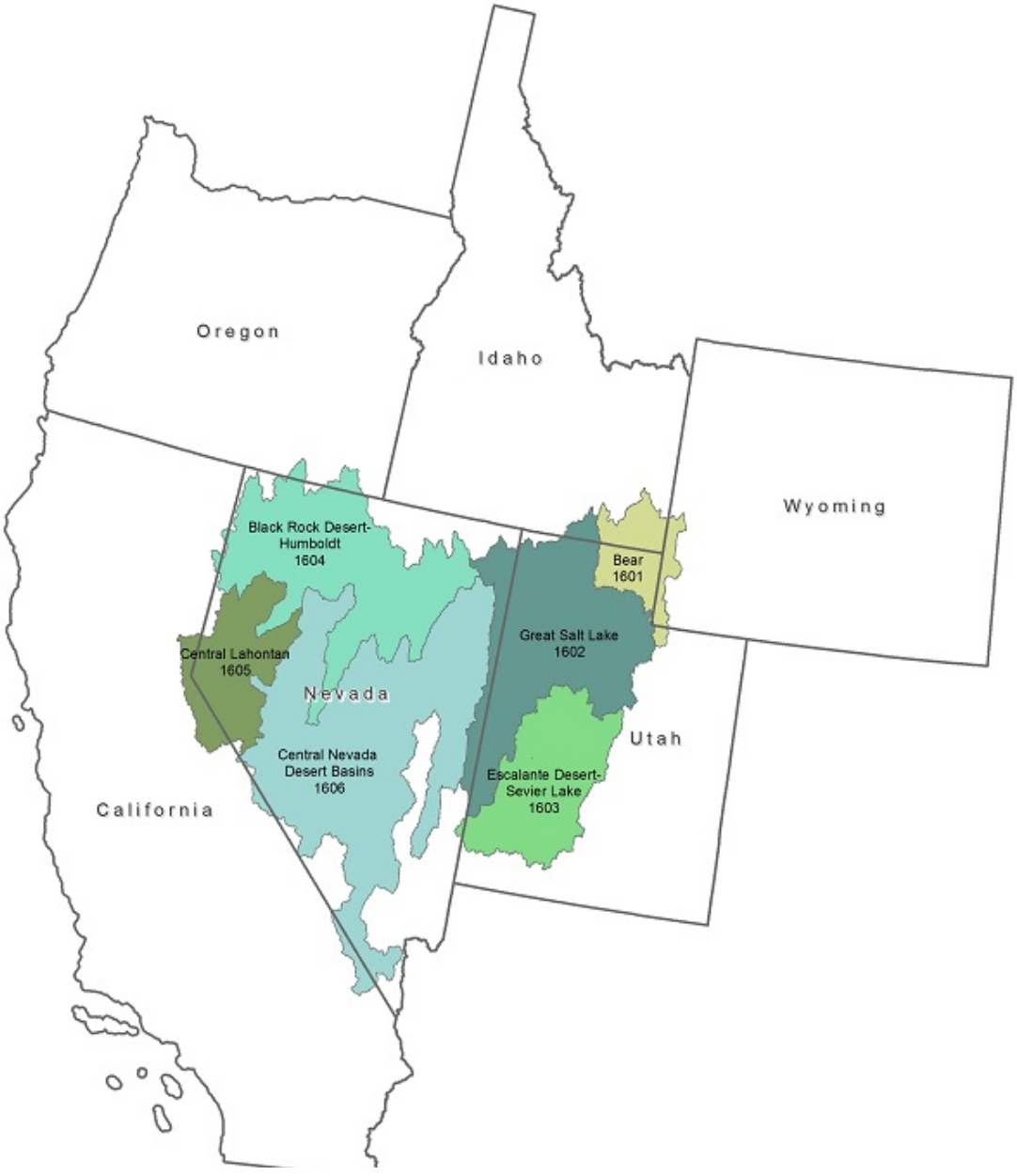




- [ ] 1501 - Lower Colorado-Lake Mead
- [ ] 1502 - Little Colorado
- [ ] 1503 - Lower Colorado
- [ ] 1504 - Upper Gila
- [ ] 1505 - Middle Gila
- [ ] 1506 - Salt
- [ ] 1507 - Lower Gila
- [ ] 1508 - Sonora
- [ ] All codes

Question 11c16. 16 Great Basin

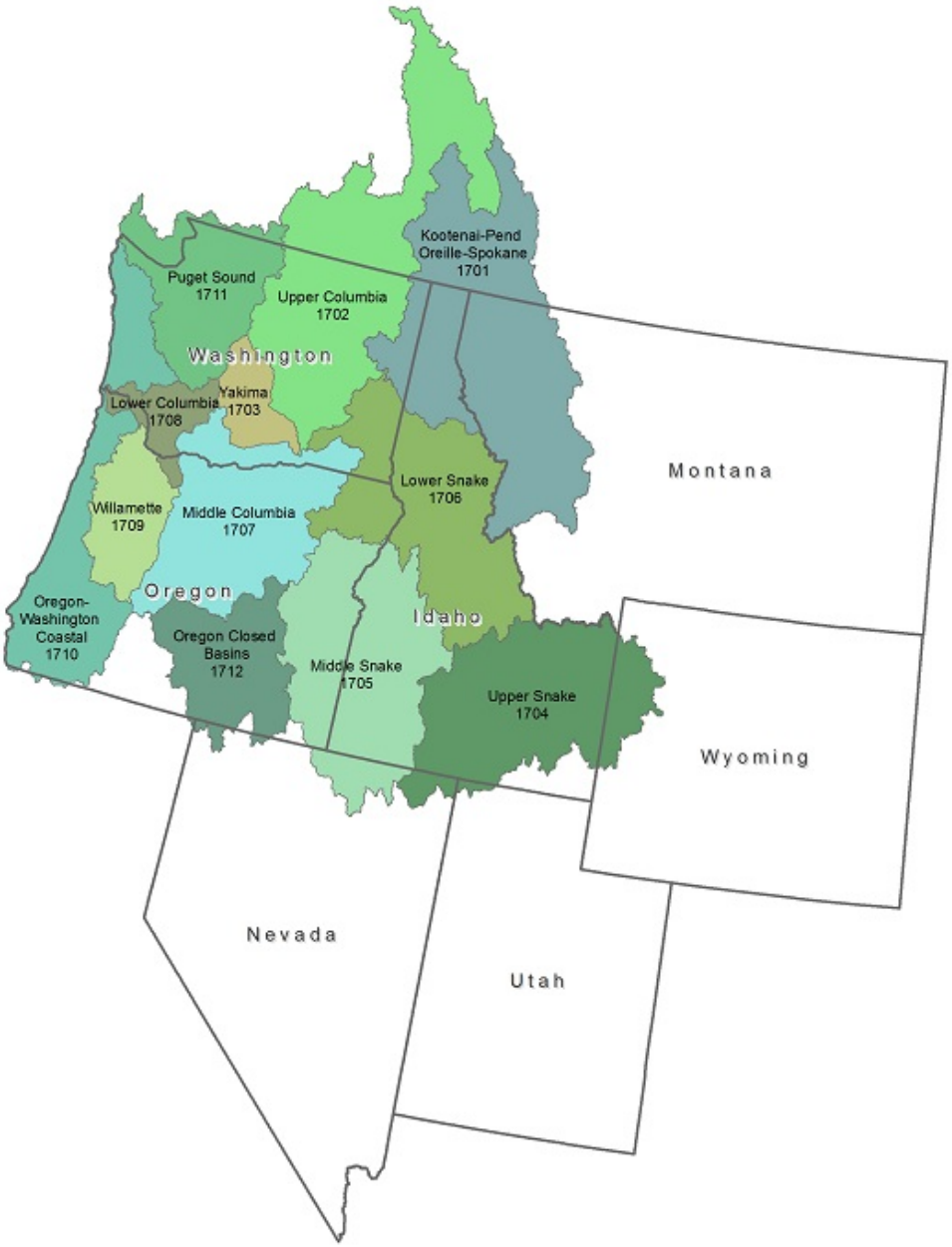
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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
- [ ] 1705 - Middle Snake
- [ ] 1708 - Lower Columbia
- [ ] 1709 - Willamette
- [ ] 1710 - Oregon-Washington Coastal
- [ ] 1711 - Puget Sound
- [ ] 1712 - Oregon Closed Basins

- [ ] 1706 - Lower Snake
- [ ] 1707 - Middle Columbia
- [ ] All codes

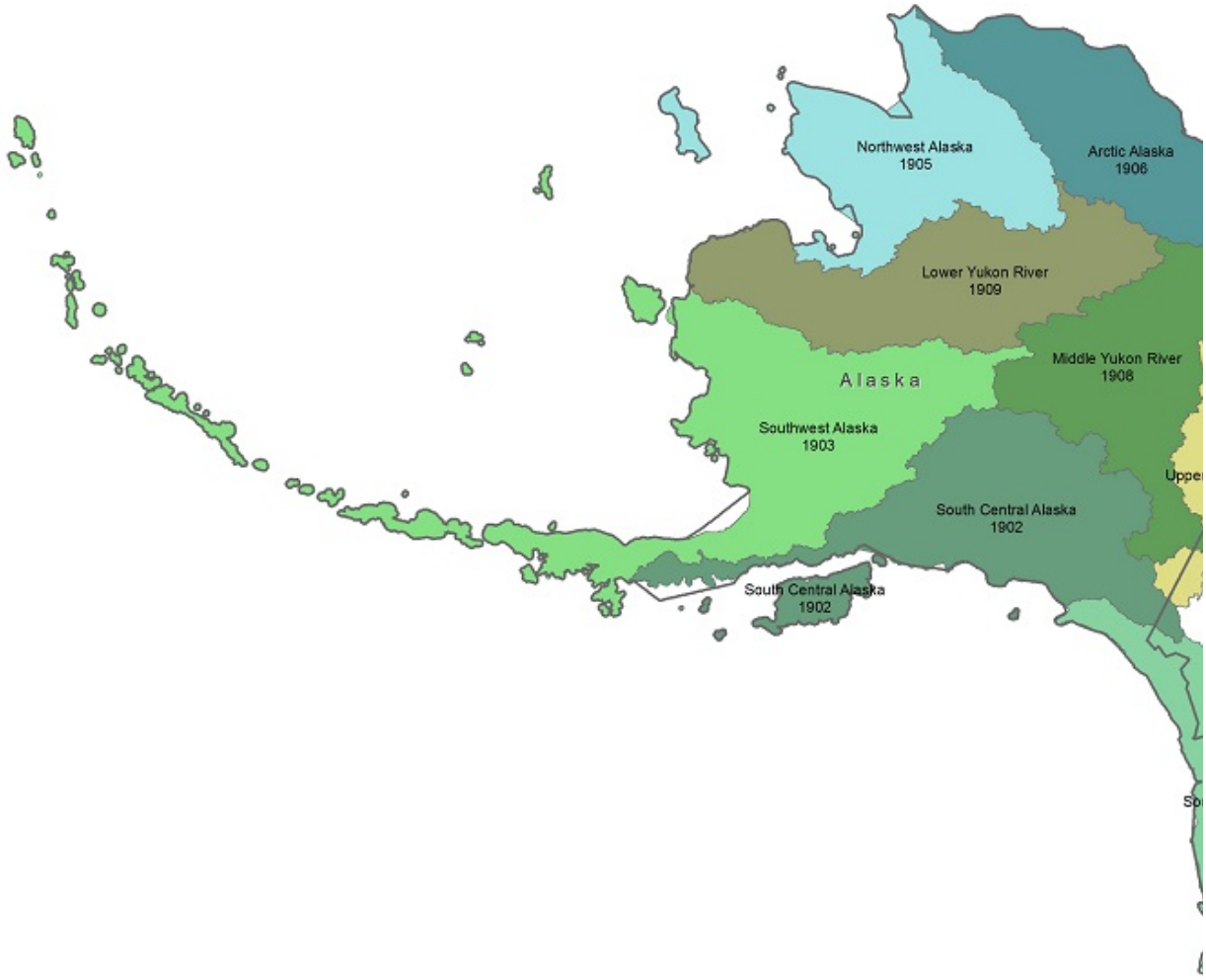
Question 11c18. 18 California

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

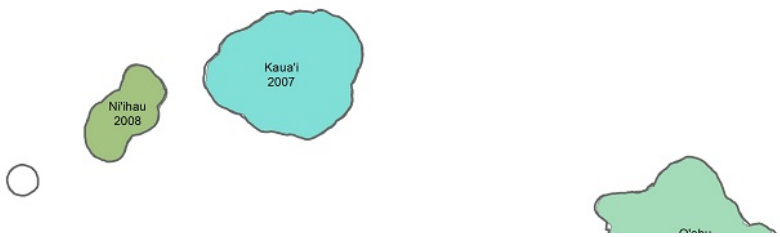
Please select individual HUC-4 codes for your specific hydrologic units.

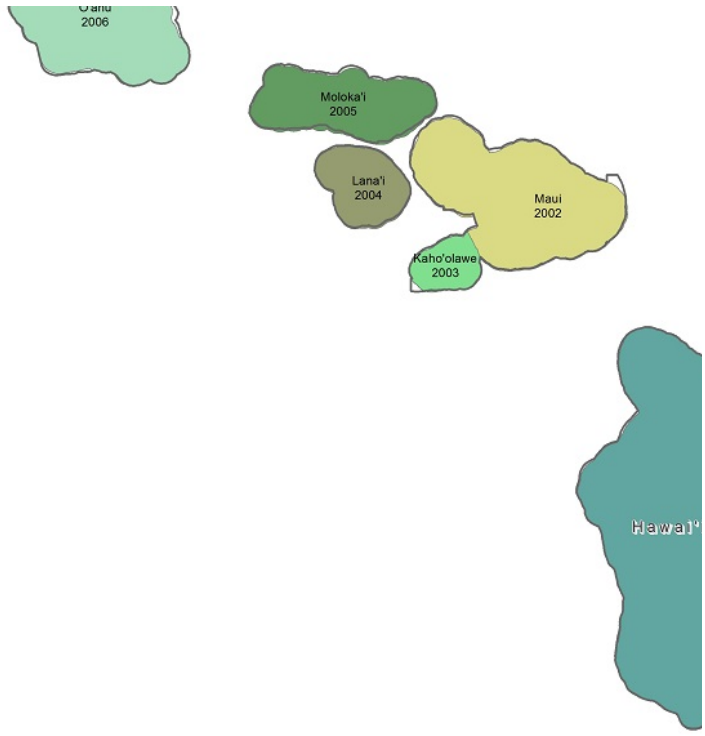


- [ ] 1901 - Southeast Alaska
- [ ] 1902 - South Central Alaska
- [ ] 1903 - Southwest Alaska
- [ ] 1905 - Northwest Alaska
- [ ] 1906 - Arctic Alaska
- [ ] 1907 - Upper Yukon River
- [ ] 1908 - Middle Yukon River
- [ ] 1909 - Lower Yukon River
- [ ] All codes

Question 11c20. 20 Hawai'i

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





- [ ] 2001 - Hawai'i
- [ ] 2002 - Maui
- [ ] 2003 - Kaho'olawe
- [ ] 2004 - Lana'i
- [ ] 2005 - Moloka'i
- [ ] 2006 - O'ahu
- [ ] 2007 - Kaua'i
- [ ] 2008 - Ni'ihau
- [ ] 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
- [ ] All lands of U.S. Tribes
- [ ] 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

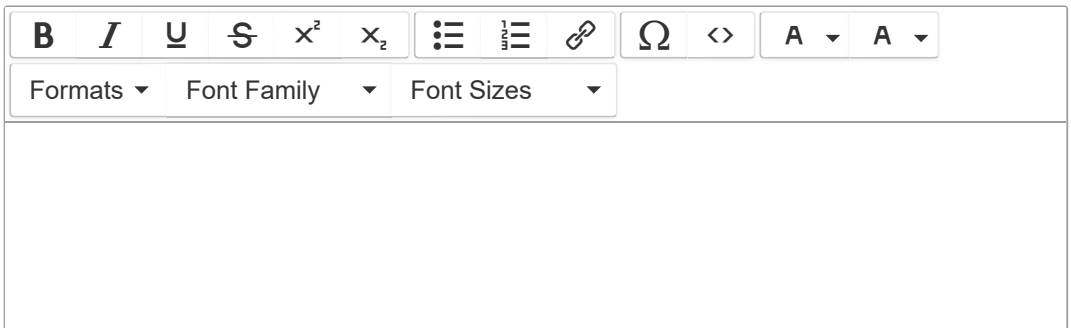
Question 14. For areas near the coast, how far down the beach profile do you need 3D topographic data to support your Mission Critical Activity? Check only one. See FAQ #9.

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

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 specify):

Question 17. For the inland topography portion of your Mission Critical Activity, do the Quality Level 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: 1) Required, 2) Highly desirable, 3) Nice to have, 4) 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: 1) Required, 2) Highly desirable, 3) Nice to have, 4) 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 specify and rat	○	○	○	○
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 specify and rat	○	○	○	○

Question 19b. 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. See FAQ #16.

Importance rating: 1) Required, 2) Highly desirable, 3) Nice to have, 4) 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 specify and rat	○	○	○	○

Question 21. For the Mission Critical Activity that you specified, please describe the importance of integration of your inland 3D topographic data with other datasets. For each data type, identify how important the data integration is. 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: 1) Required, 2) Highly desirable, 3) Nice to have, 4) 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 specify and ra	○	○	○	○

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.

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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 specify):

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

B I U S x^2 x_2 A A

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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 document.

	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)	○	○	○	○	○

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 document.

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**

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	
	Major	Moderate	Minor	None	Don't know			
Future Operational Benefits from 3D inland topographic data								
Time Savings								
Hours saved from faster and/or avoided field visits/inspections.	○	○	○	○	○	Select: ▼		
Hours saved through more efficient modeling, reviews, reporting, data dissemination, mapping, or other procedures	○	○	○	○	○	Select: ▼		
Hours saved from reduced or avoided data manipulation (e.g., combining data from multiple sources; changing projection, datum, etc.)	○	○	○	○	○	Select: ▼		
Hours saved from reduced or avoided data errors	○	○	○	○	○	Select: ▼		
Hours saved through in-office project planning or monitoring	○	○	○	○	○	Select: ▼		
Hours saved from more streamlined operations (e.g., permitting processes, offshore boundary determinations, etc.)	○	○	○	○	○	Select: ▼		
Other (please describe)	○	○	○	○	○	Select: ▼		

	Benefits your program is likely to receive					Dollars Saved	Amount of Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
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	○	○	○	○	○	Select: ▼		
Materials saved (e.g., fertilizer, pesticides, water, irrigation systems, pond								

design, beach/dune restoration, building/construction materials, etc.)	○	○	○	○	○	Select: ▼		
Other (please describe)	○	○	○	○	○	Select: ▼		

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

	Benefits your program is likely to receive					Dollars Realized/Earned	Amount of Dollars Realized/Earned	
	Major	Moderate	Minor	None	Don't know			
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.)	○	○	○	○	○	Select: ▼		
Increased cargo carrying capacity	○	○	○	○	○	Select: ▼		
New products, services, or applications/apps sold	○	○	○	○	○	Select: ▼		
Other (please describe)	○	○	○	○	○	Select: ▼		

	Benefits your program is likely to receive					Improvement	Percent Improvement	
	Major	Moderate	Minor	None	Don't know			
Future Operational Benefits from 3D inland topographic data								
Mission-driven Performance Improvements								
Increased program effectiveness	○	○	○	○	○	Select: ▼		
Improved ability to carry out mission	○	○	○	○	○	Select: ▼		

Improved decision making due to better data, modeling, etc.	○	○	○	○	○	Select:		
Other (please describe)	○	○	○	○	○	Select:		

	Benefits your program is likely to receive					Hours/Dollars Saved	Amount of Hours/Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
Future Operational Benefits from 3D inland topographic data								
Other (please describe in your own words)								
Please describe	○	○	○	○	○	Select:		

	Benefits your program is likely to receive					Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
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.)	○	○	○	○	○	Select:		
Improved accuracy of products or services (e.g. navigation charts, nautical charts, shoreline delineation, flood hazard maps, flood warnings, etc.)	○	○	○	○	○	Select:		
Other (please describe)	○	○	○	○	○	Select:		

	Benefits your program is likely to receive					Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
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.)	○	○	○	○	○	Select:		
Faster response to an incident or event (e.g., faster access to impacted areas, faster response and recovery operations, improved evacuation plans, etc.)	○	○	○	○	○	Select:		
Faster recovery after an event (e.g., faster port reopening after hurricane, faster identification of damaged structures, faster	○	○	○	○	○	Select:		

	Major	Moderate	Minor	None	Don't know	Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
Information about Advisory Base Flood Elevations, etc.)								
Improved customer assistance (e.g., use of data allows virtual view and support via phone, email, chat)	○	○	○	○	○	Select:		
More up to date services or products (e.g., nautical charts, navigation charts, flood hazard maps, etc.)	○	○	○	○	○	Select:		
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.)	○	○	○	○	○	Select:		
Other (please describe)	○	○	○	○	○	Select:		

	Benefits your program is likely to receive: Major	Moderate	Minor	None	Don't know	Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
Future Customer Service Benefits from 3D inland topographic data								
Improved Customer Experience								
Increased customer confidence in products or services	○	○	○	○	○	Select:		
New services, tools, or applications/apps	○	○	○	○	○	Select:		
Better data availability (faster downloads, data are all in one place, etc.)	○	○	○	○	○	Select:		
Other (please describe)	○	○	○	○	○	Select:		

	Benefits your program is likely to receive: Major	Moderate	Minor	None	Don't know	Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
Future Customer Service Benefits from 3D inland topographic data								
Other (please describe in your own words)								
Please describe	○	○	○	○	○	Select:		

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

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	○	○	○	○	○	

Part 3.2 - Questions for Inland Bathymetry Requirements

***Question 24. In this section, please identify the geographic area requirements for the inland 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 inland geographic area requirements for 3D elevation data for your Mission Critical Activity are nationwide, please check the items below that best represent your nationwide requirements.**

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

***Question 24b. If your inland geographic area requirements for 3D elevation 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
- [ ] Colorado
- [ ] Connecticut
- [ ] Delaware
- [ ] Federated States of Micronesia
- [ ] Florida
- [ ] Georgia
- [ ] Guam
- [ ] Hawai'i
- [ ] Idaho
- [ ] Illinois
- [ ] Indiana
- [ ] Iowa
- [ ] Kansas
- [ ] Kentucky
- [ ] Michigan
- [ ] Minnesota
- [ ] Mississippi
- [ ] Missouri
- [ ] Montana
- [ ] Nebraska
- [ ] Nevada
- [ ] New Hampshire
- [ ] New Jersey
- [ ] New Mexico
- [ ] New York
- [ ] North Carolina
- [ ] North Dakota
- [ ] Northern Mariana Islands
- [ ] Ohio
- [ ] 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 24b1. Do you have any sub-regions (counties or cities) where 3D elevation information is required?

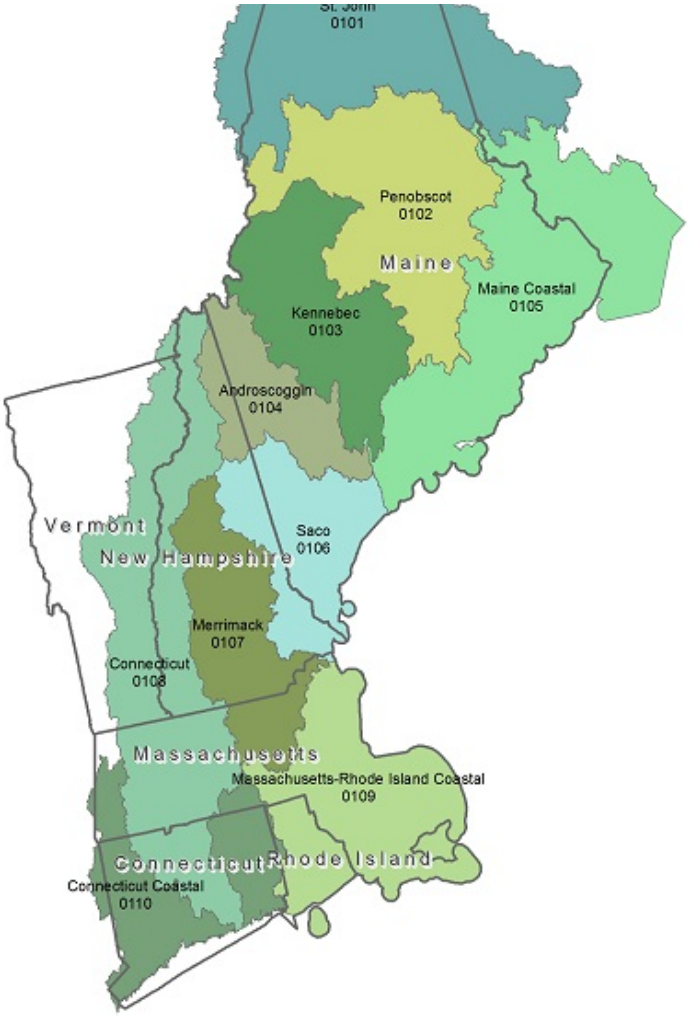
- ( ) Yes
- ( ) No

***Question 24c. If your inland geographic area requirements 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

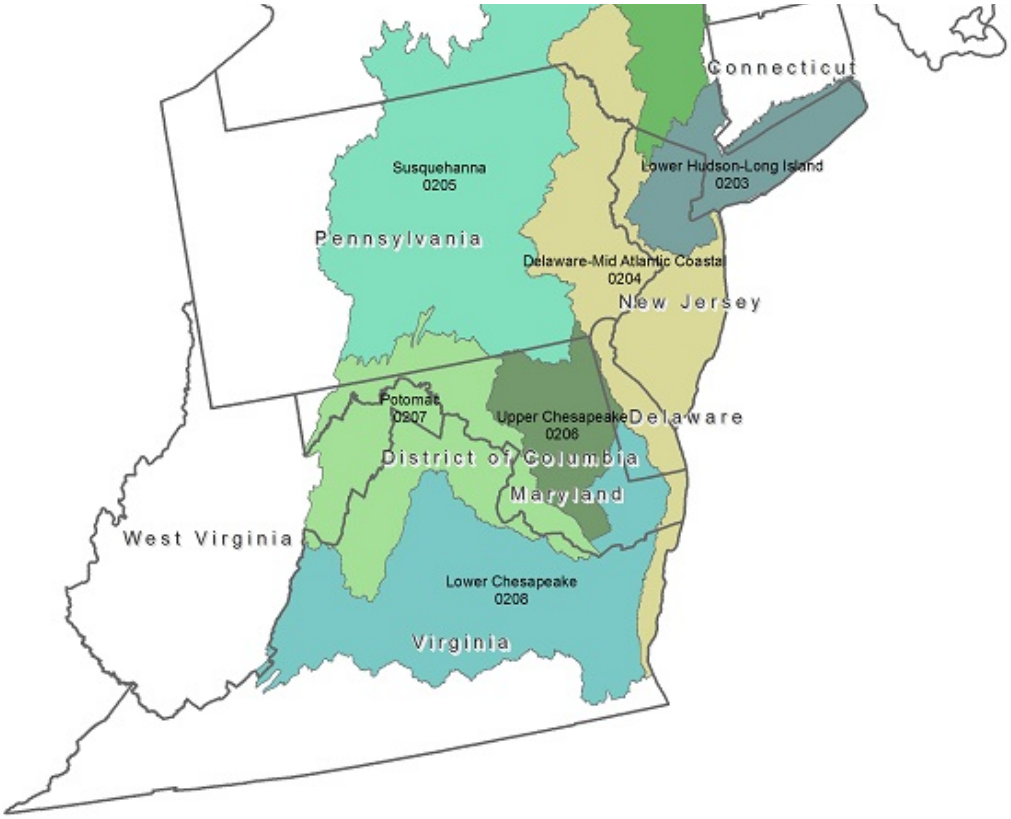
Please select individual HUC-4 codes for your specific hydrologic units.



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

Question 24c2. 02 Mid-Atlantic

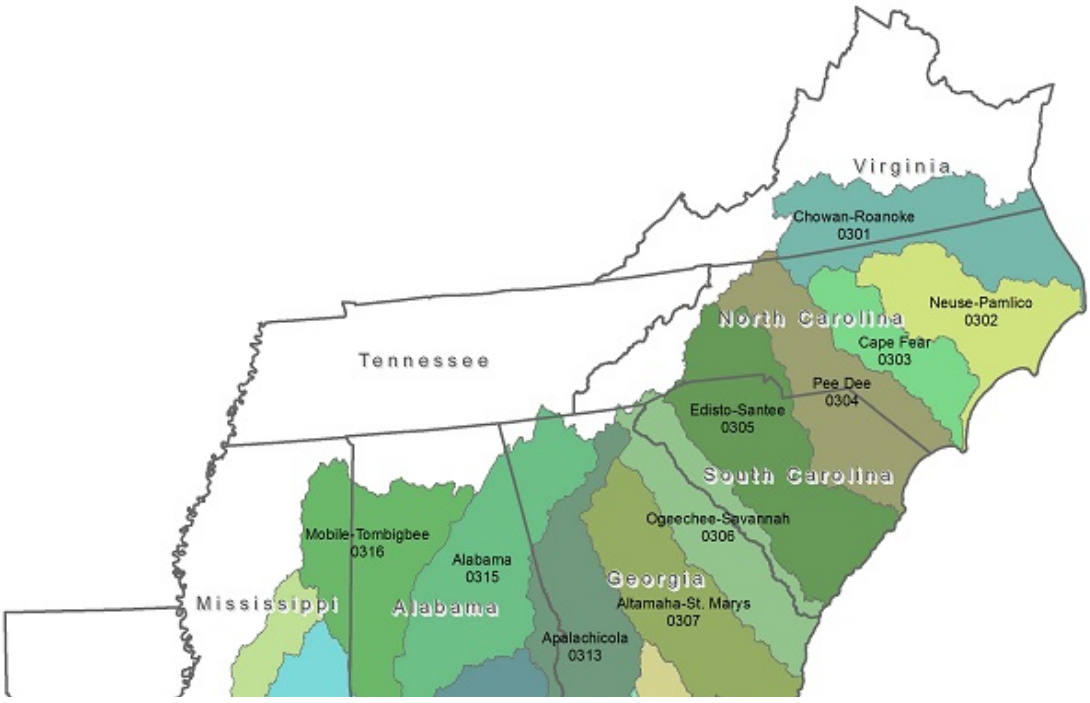
Please select individual HUC-4 codes for your specific hydrologic units.

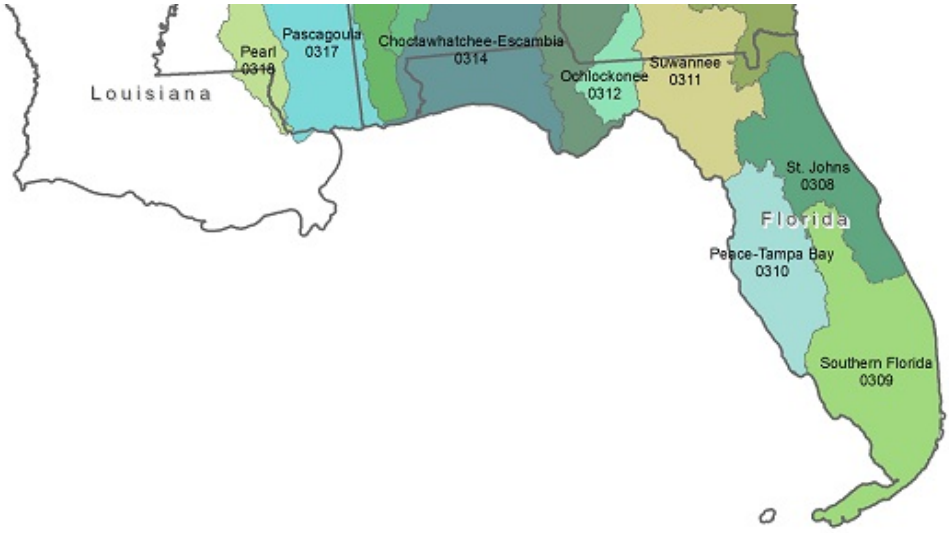


- [ ] 0202 - Upper Hudson
- [ ] 0203 - Lower Hudson-Long Island
- [ ] 0204 - Delaware-Mid Atlantic Coastal
- [ ] 0205 - Susquehanna
- [ ] 0206 - Upper Chesapeake
- [ ] 0207 - Potomac
- [ ] 0208 - Lower Chesapeake
- [ ] All codes

Question 24c3. 03 South Atlantic-Gulf

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

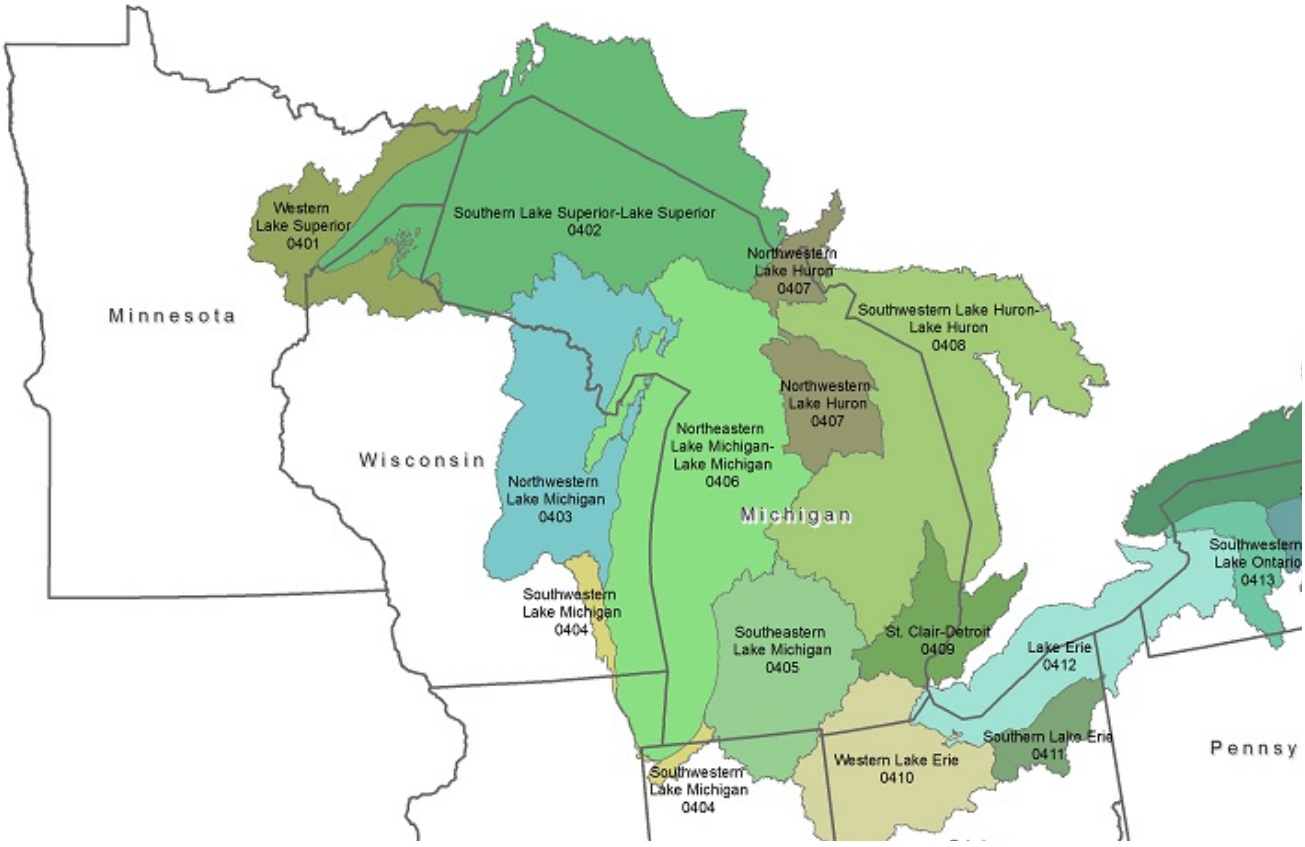




- [ ] 0301 - Chowan-Roanoke
- [ ] 0302 - Neuse-Pamlico
- [ ] 0303 - Cape Fear
- [ ] 0304 - Pee Dee
- [ ] 0305 - Edisto-Santee
- [ ] 0306 - Ogeechee-Savannah
- [ ] 0307 - Altamaha-St. Marys
- [ ] 0308 - St. Johns
- [ ] 0309 - Southern Florida
- [ ] 0310 - Peace-Tampa Bay
- [ ] 0311 - Suwannee
- [ ] 0312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

Question 24c4. 04 Great Lakes

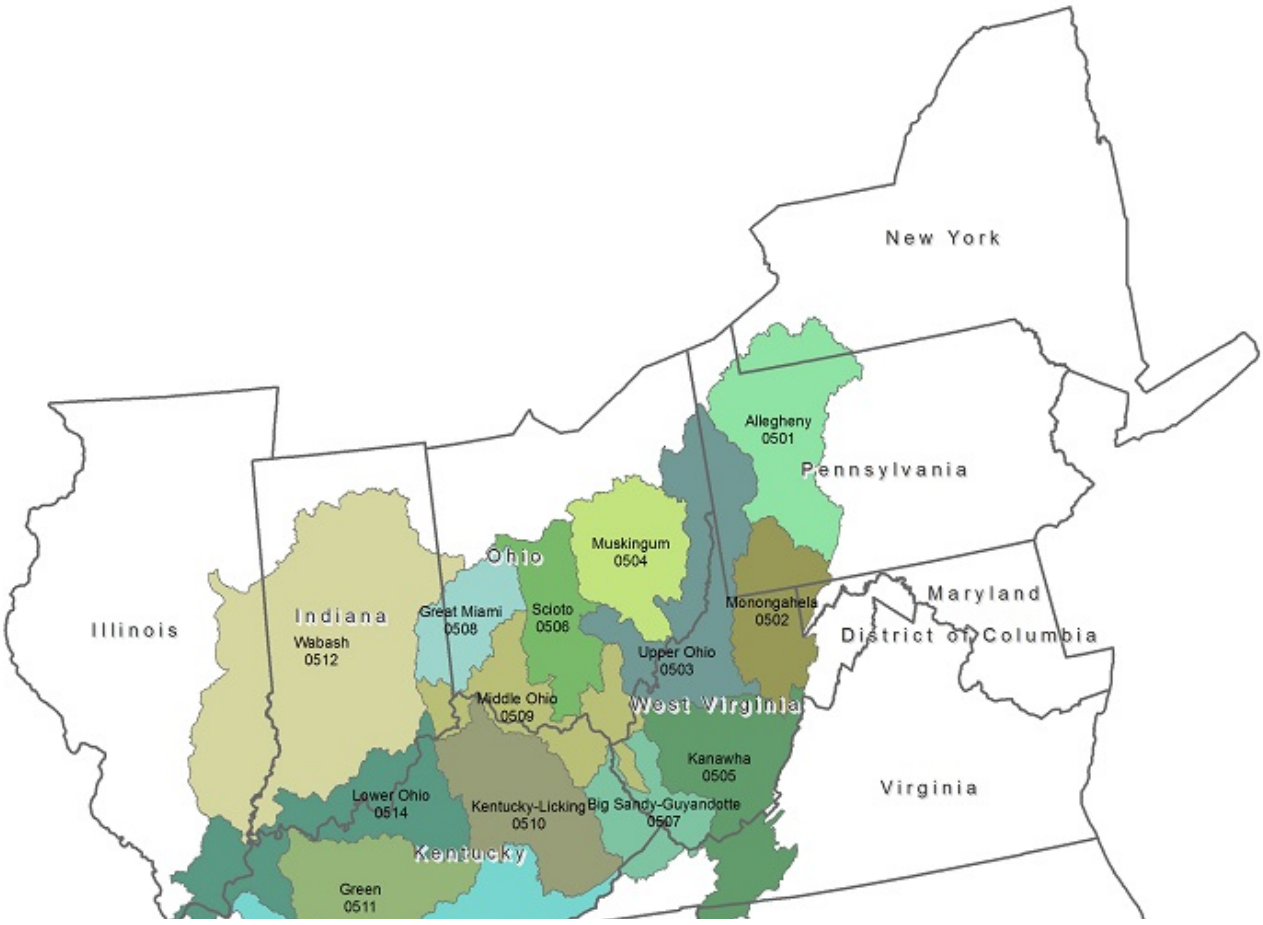
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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

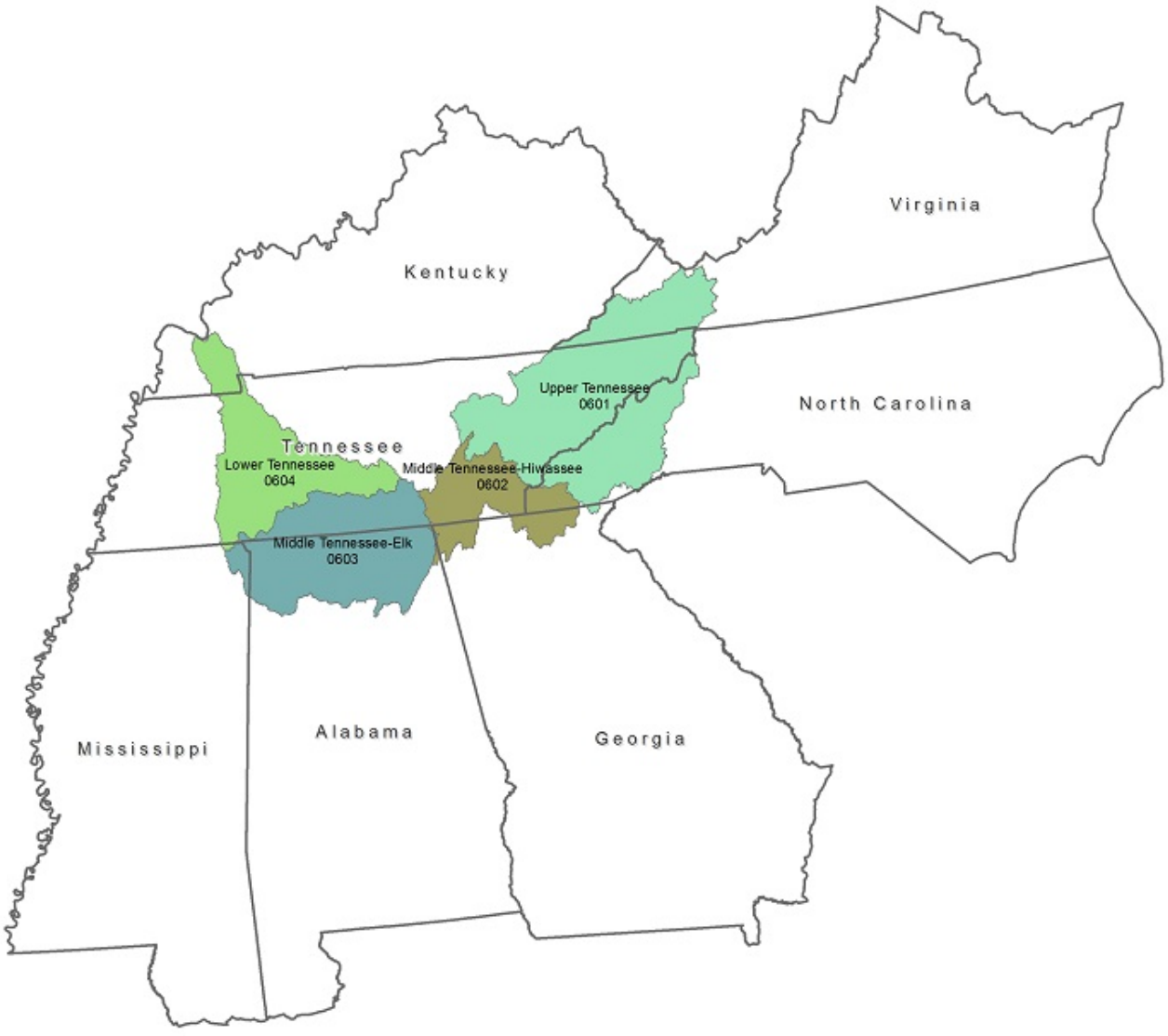
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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

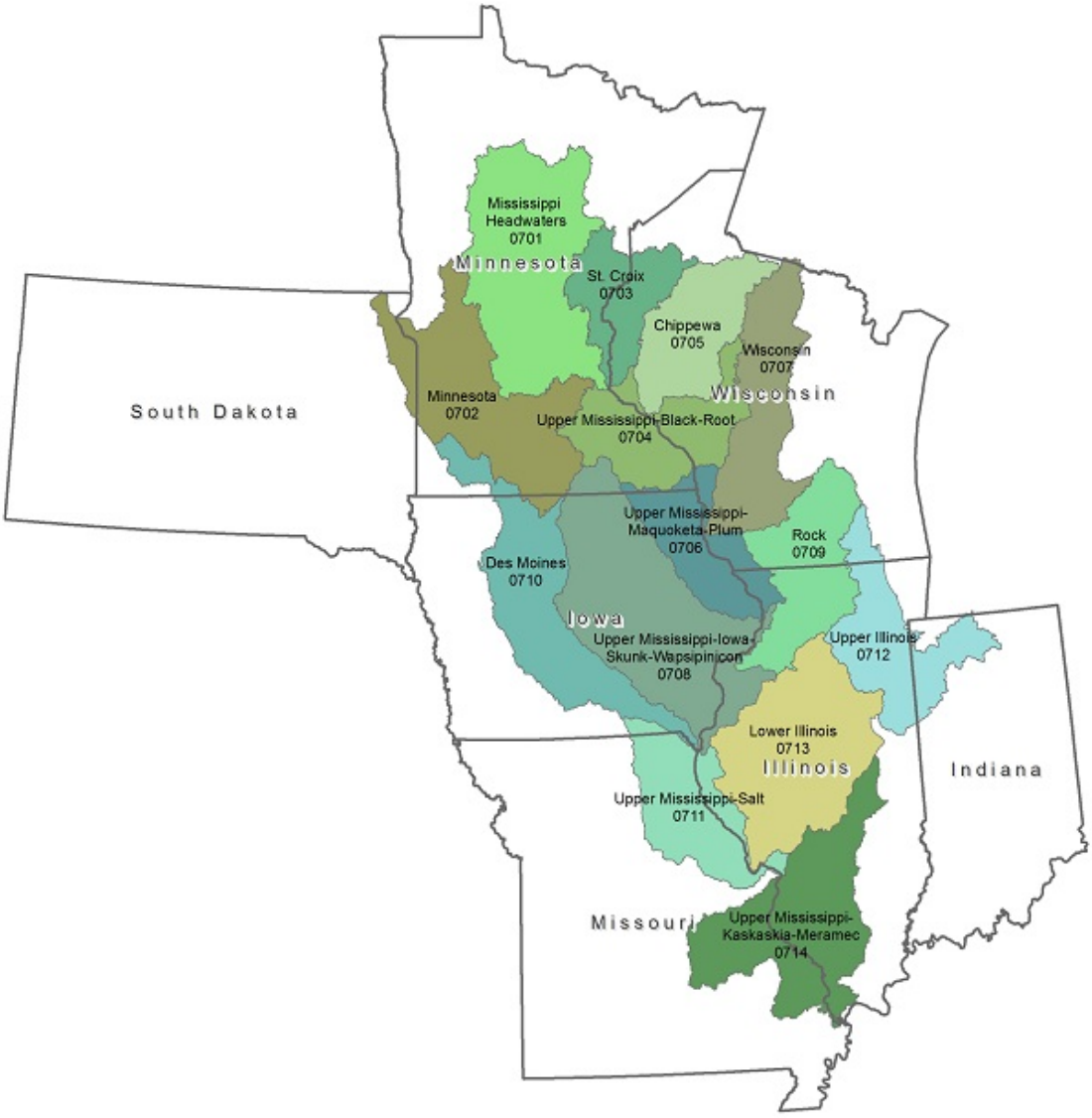
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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.

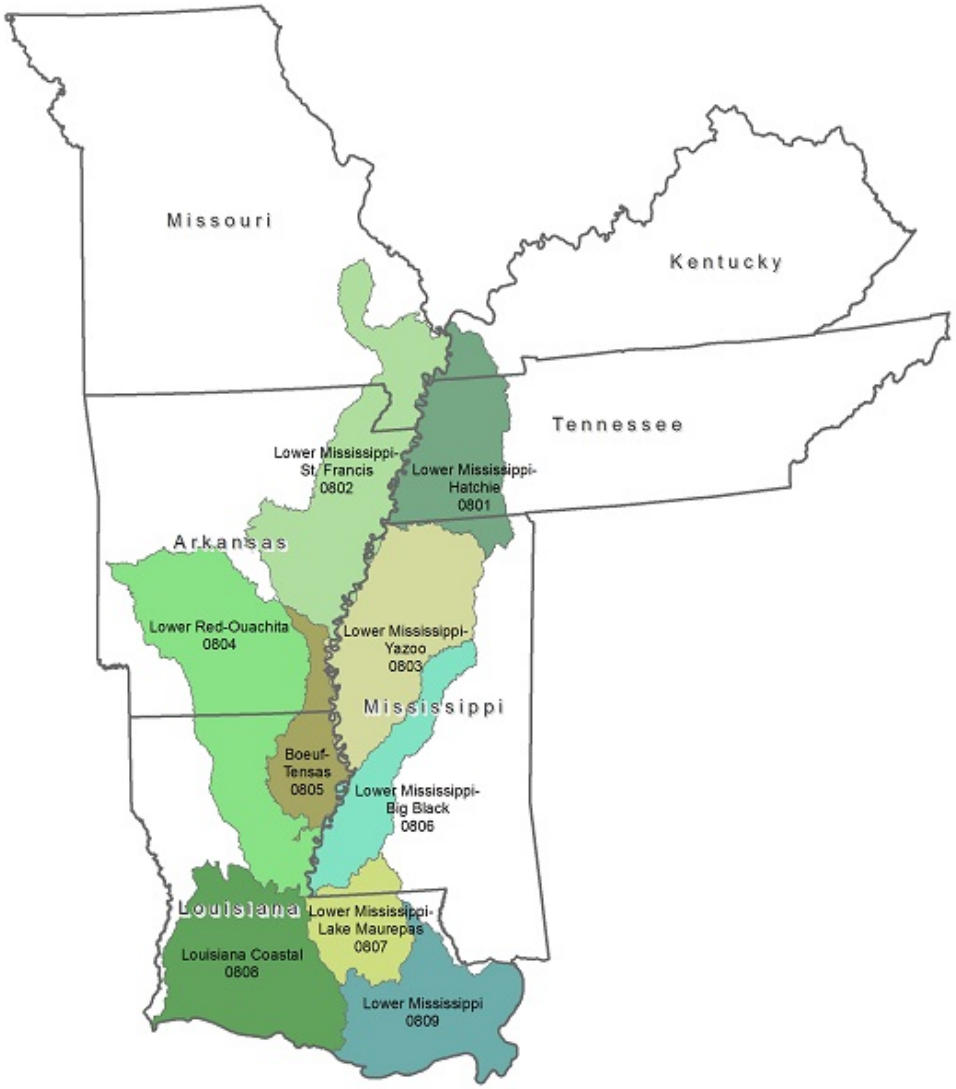


- [ ] 0701 - Mississippi Headwaters
- [ ] 0702 - Minnesota
- [ ] 0703 - St. Croix
- [ ] 0704 - Upper Mississippi-Black-Root
- [ ] 0706 - Upper Mississippi-Maquoketa-Plum
- [ ] 0707 - Wisconsin
- [ ] 0708 - Upper Mississippi-Iowa-Skunk-Wapsipinicon
- [ ] 0709 - Rock
- [ ] 0711 - Upper Mississippi-Salt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

- [ ] 0705 - Chippewa
- [ ] 0710 - Des Moines
- [ ] All codes

Question 24c8. 08 Lower Mississippi

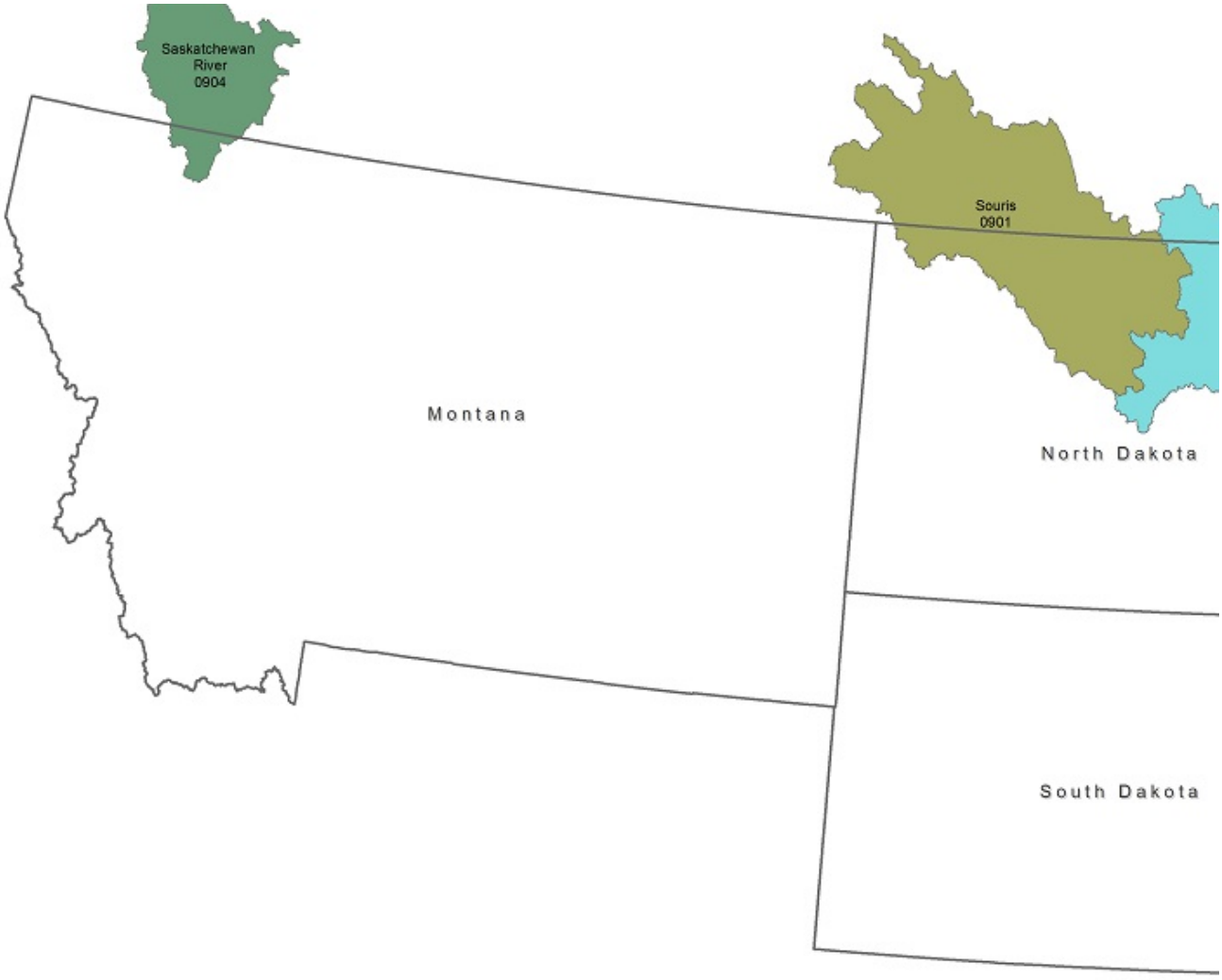
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0801 - Lower Mississippi-Hatchie
- [ ] 0802 - Lower Mississippi-St. Francis
- [ ] 0803 - Lower Mississippi-Yazoo
- [ ] 0804 - Lower Red-Ouachita
- [ ] 0805 - Boeuf-Tensas
- [ ] 0806 - Lower Mississippi-Big Black
- [ ] 0807 - Lower Mississippi-Lake Maurepas
- [ ] 0808 - Louisiana Coastal
- [ ] 0809 - Lower Mississippi
- [ ] All codes

Question 24c9. 09 Souris-Red-Rainy

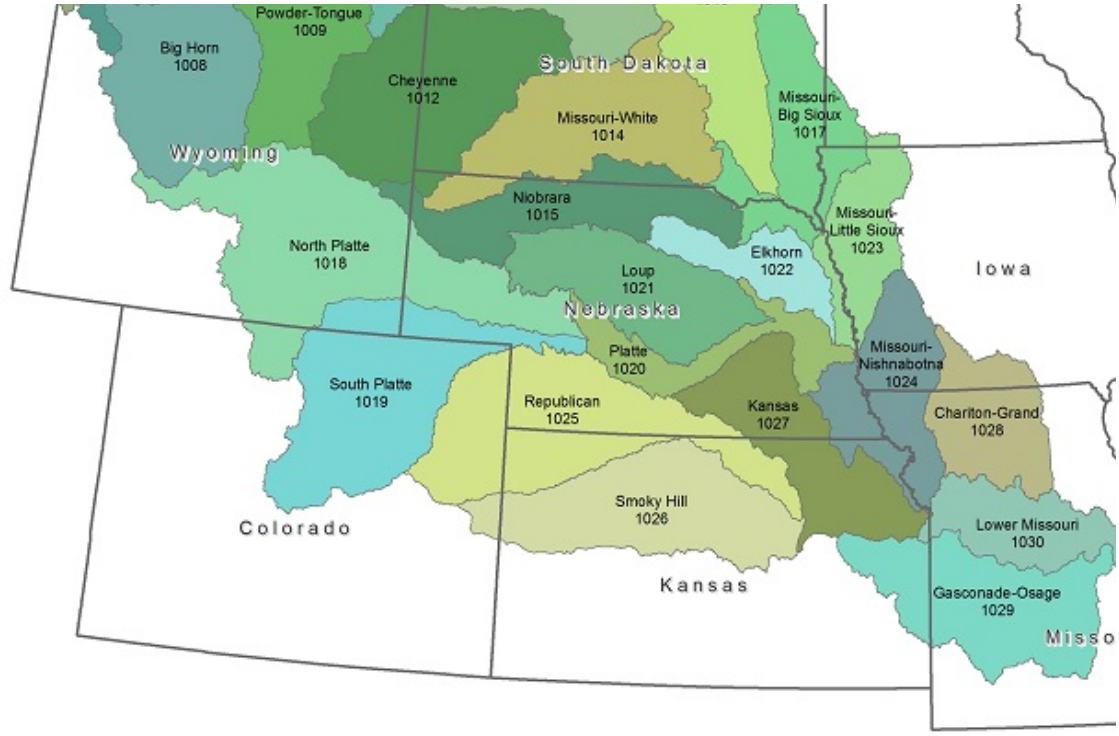
Please select individual HUC-4 codes for your specific hydrologic units.



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

Question 24c10. 10 Missouri

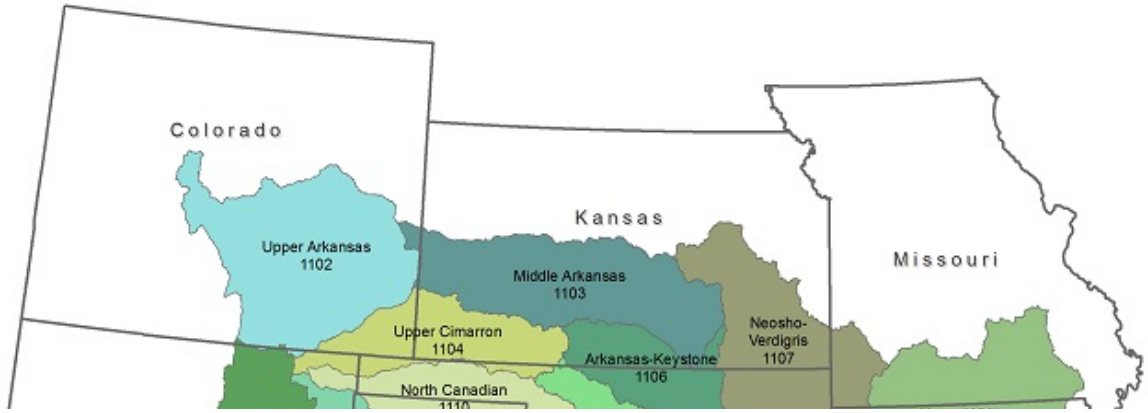
Please select individual HUC-4 codes for your specific hydrologic units.

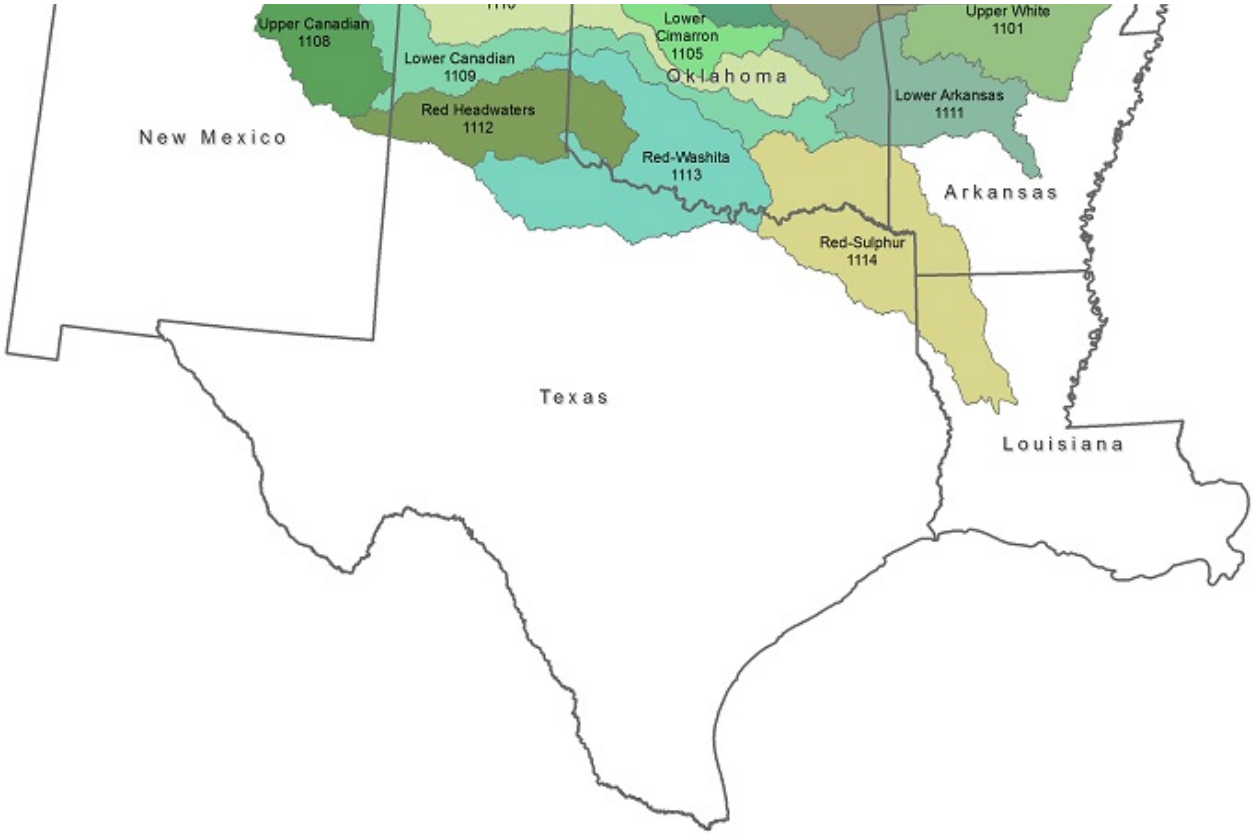


- [ ] 1002 - Missouri Headwaters
- [ ] 1003 - Missouri-Marias
- [ ] 1004 - Missouri-Musselshell
- [ ] 1005 - Milk
- [ ] 1006 - Missouri-Poplar
- [ ] 1007 - Upper Yellowstone
- [ ] 1008 - Big Horn
- [ ] 1009 - Powder-Tongue
- [ ] 1010 - Lower Yellowstone
- [ ] 1011 - Missouri-Little Missouri
- [ ] 1012 - Cheyenne
- [ ] 1013 - Missouri-Oahe
- [ ] 1014 - Missouri-White
- [ ] 1015 - Niobrara
- [ ] 1016 - James
- [ ] 1017 - Missouri-Big Sioux
- [ ] 1018 - North Platte
- [ ] 1019 - South Platte
- [ ] 1020 - Platte
- [ ] 1021 - Loup
- [ ] 1022 - Elkhorn
- [ ] 1023 - Missouri-Little Sioux
- [ ] 1024 - Missouri-Nishnabotna
- [ ] 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.

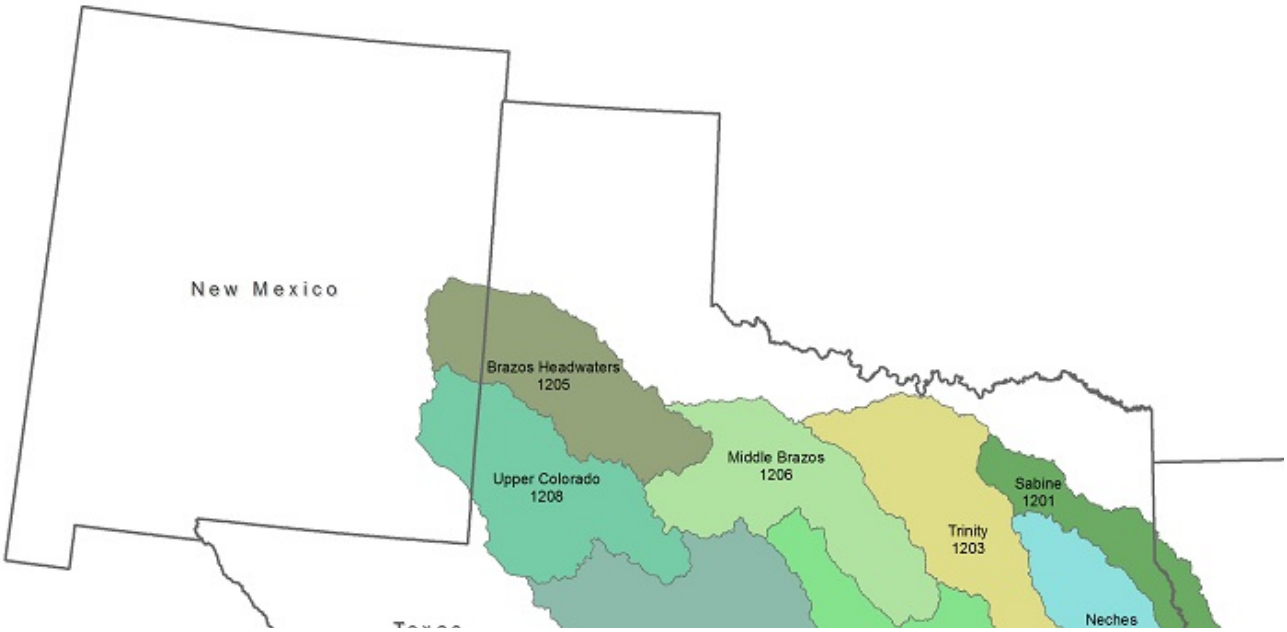


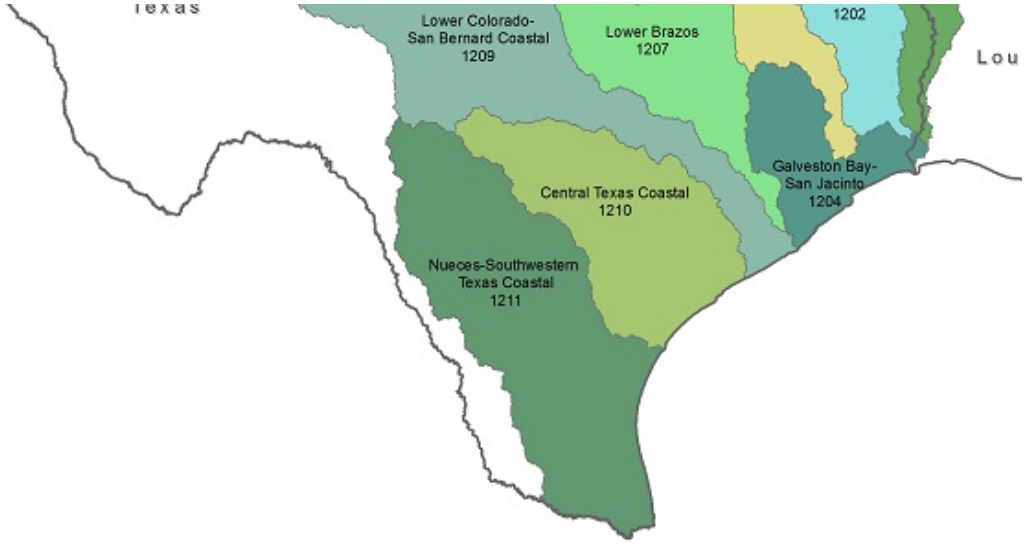


- [ ] 1101 - Upper White
- [ ] 1102 - Upper Arkansas
- [ ] 1103 - Middle Arkansas
- [ ] 1104 - Upper Cimarron
- [ ] 1105 - Lower Cimarron
- [ ] 1106 - Arkansas-Keystone
- [ ] 1107 - Neosho-Verdigris
- [ ] 1108 - Upper Canadian
- [ ] 1109 - Lower Canadian
- [ ] 1110 - North Canadian
- [ ] 1111 - Lower 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.

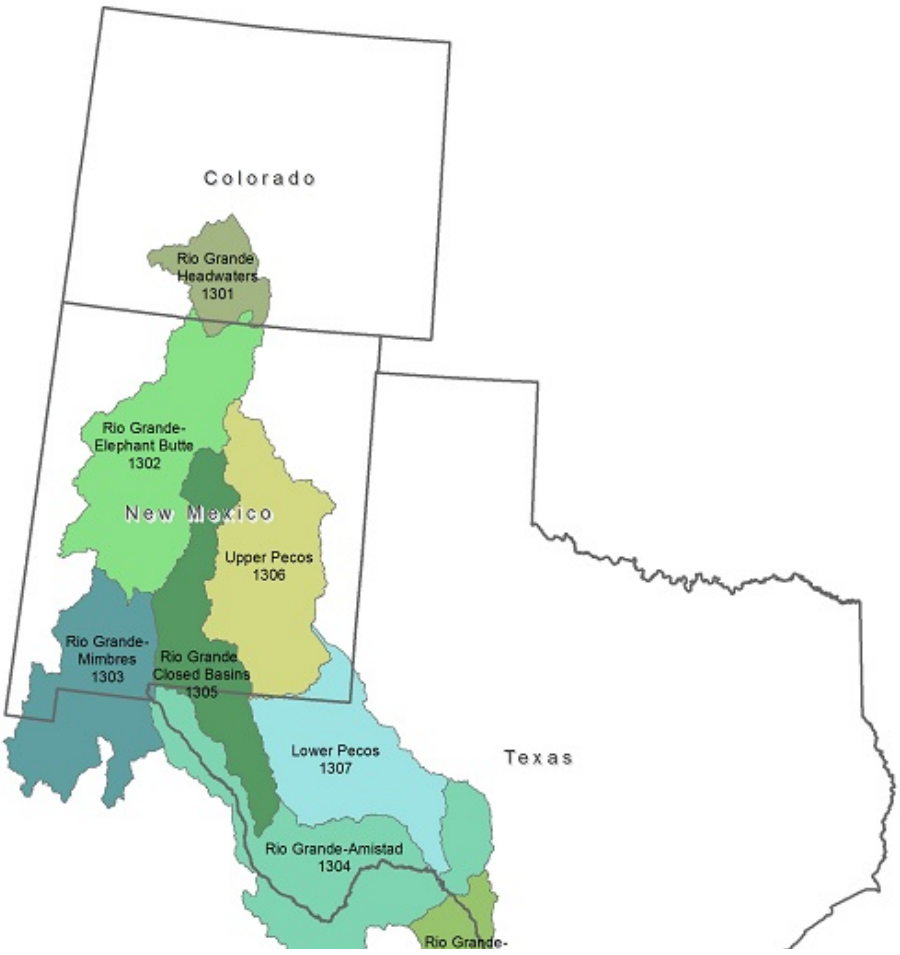




- [ ] 1201 - Sabine
- [ ] 1202 - Neches
- [ ] 1203 - Trinity
- [ ] 1204 - Galveston Bay-San Jacinto
- [ ] 1205 - Brazos Headwaters
- [ ] 1206 - Middle Brazos
- [ ] 1207 - Lower Brazos
- [ ] 1208 - Upper Colorado
- [ ] 1209 - Lower Colorado-San Bernard Coastal
- [ ] 1210 - Central Texas Coastal
- [ ]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

Question 24c13. 13 Rio Grande

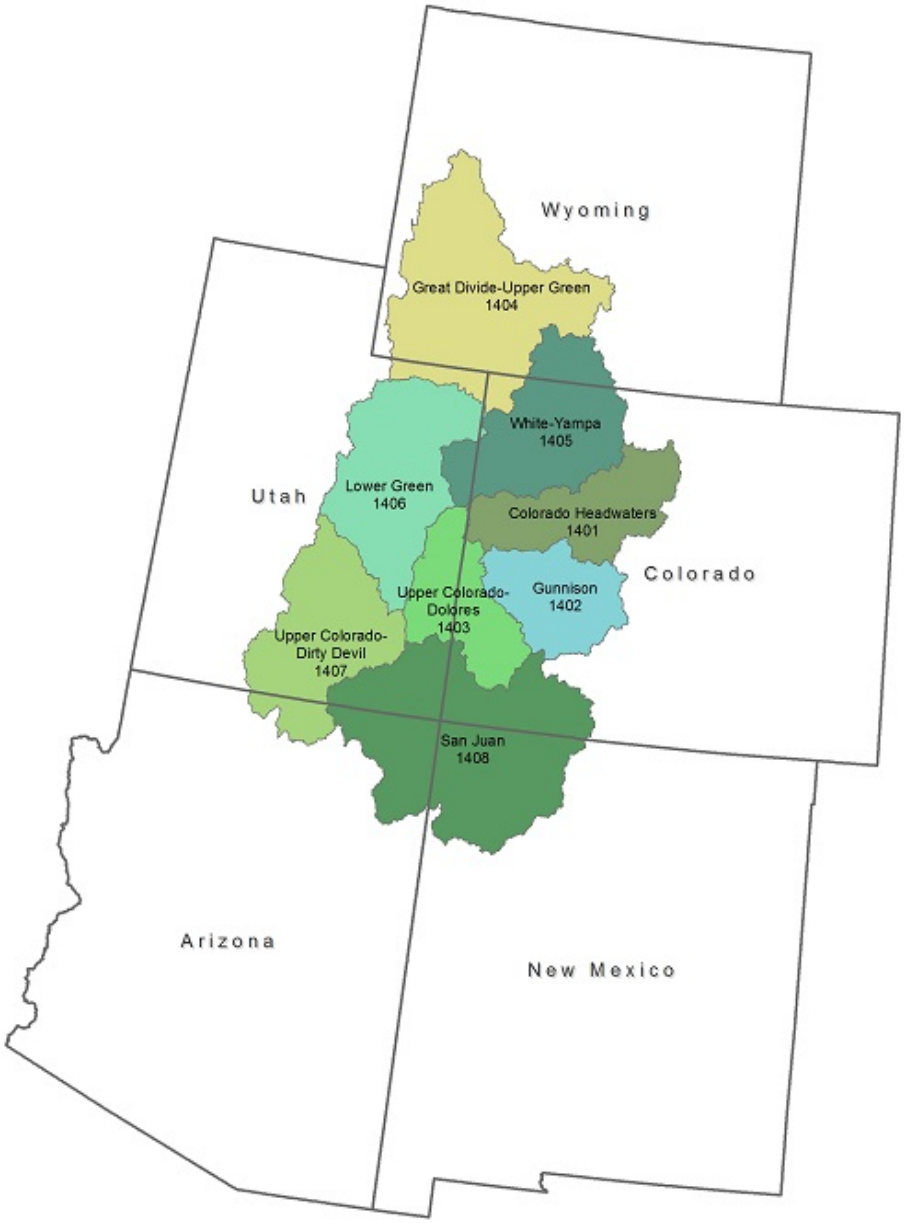
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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

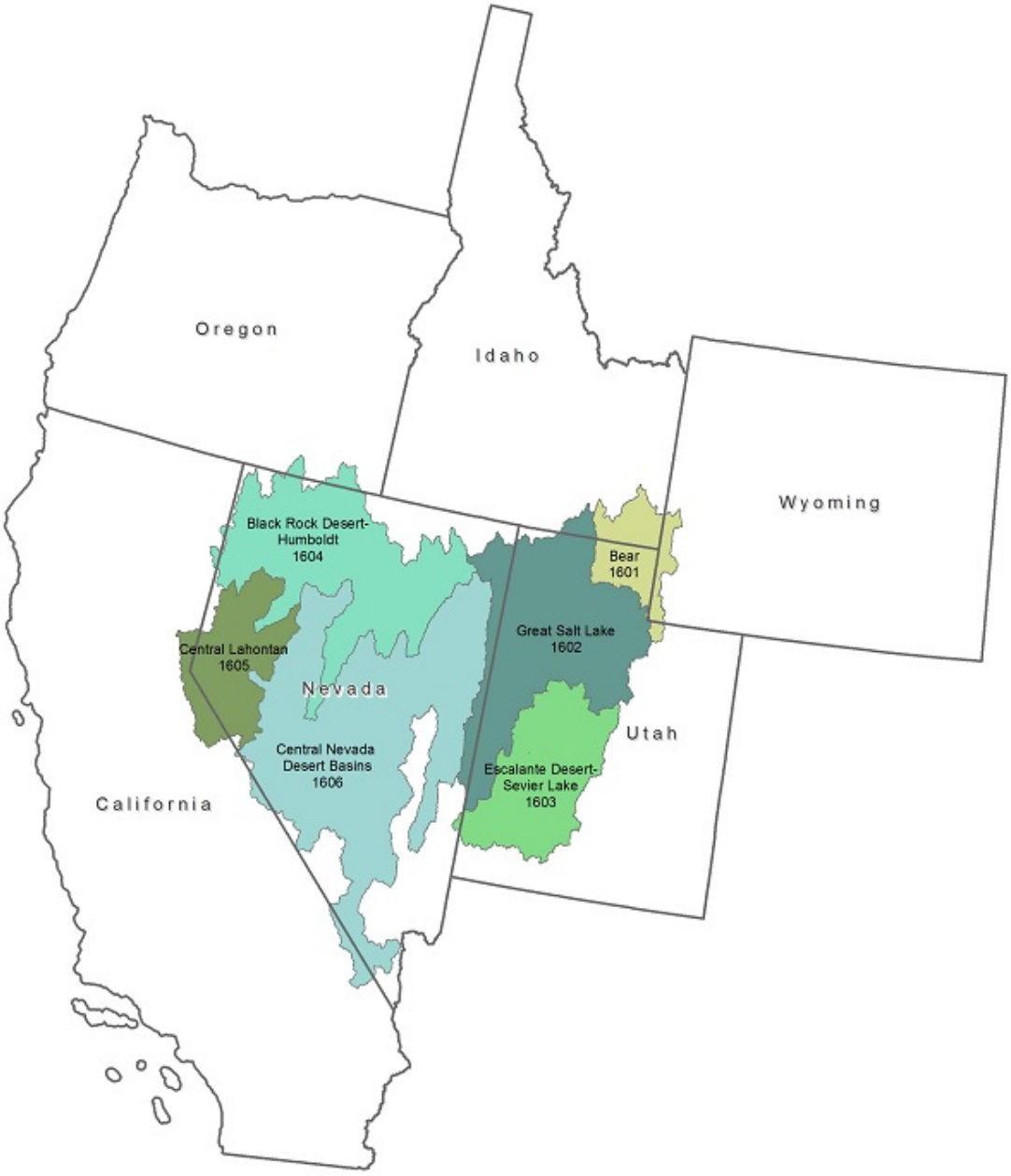
Question 24c15. 15 Lower Colorado

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

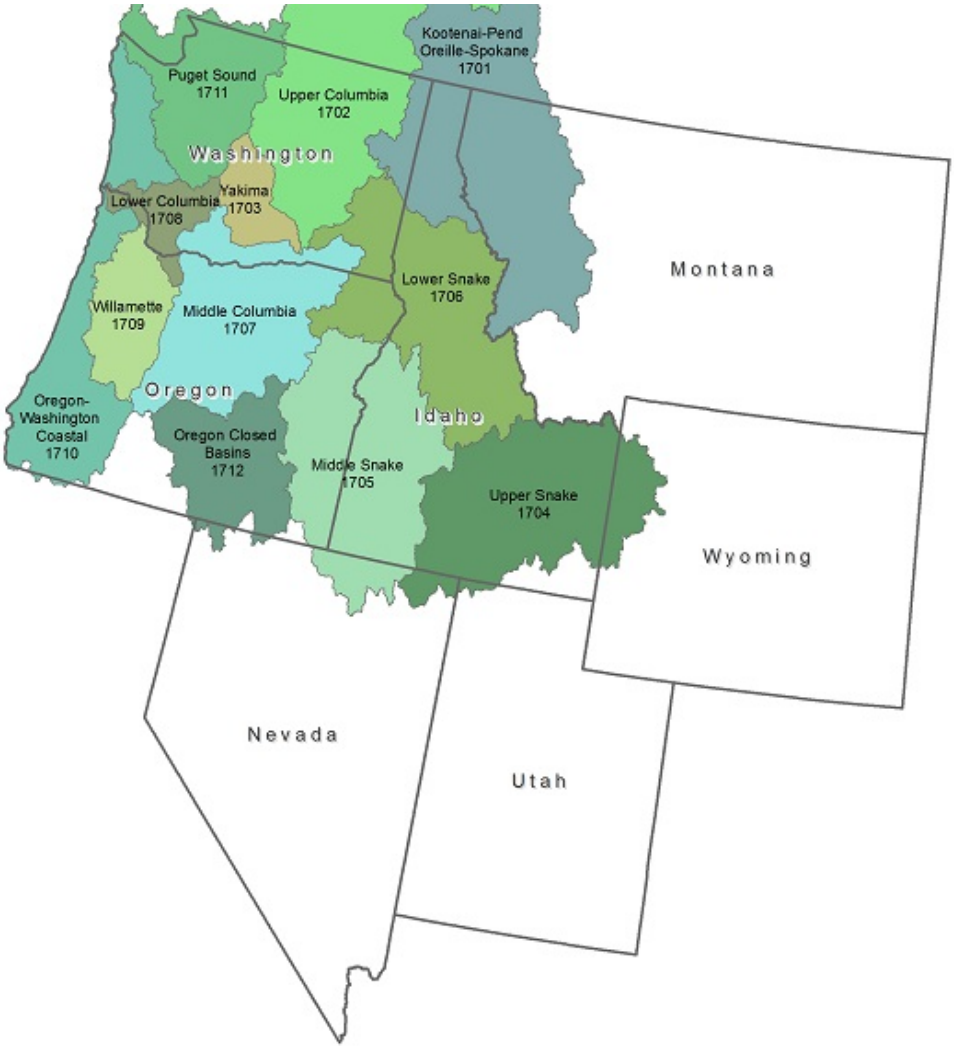
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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

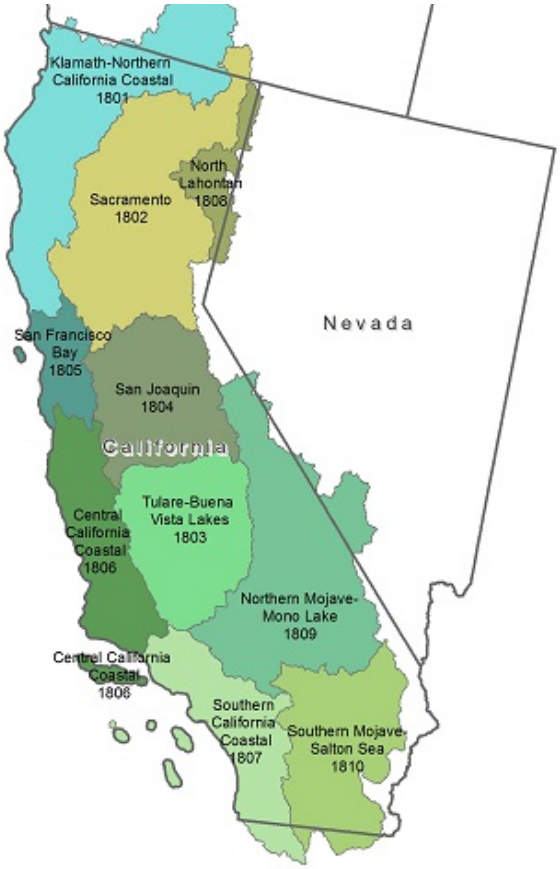
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 1701 - Kootenai-Pend Oreille-Spokane
- [ ] 1702 - Upper Columbia
- [ ] 1703 - Yakima
- [ ] 1704 - Upper Snake
- [ ] 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 24c18. 18 California

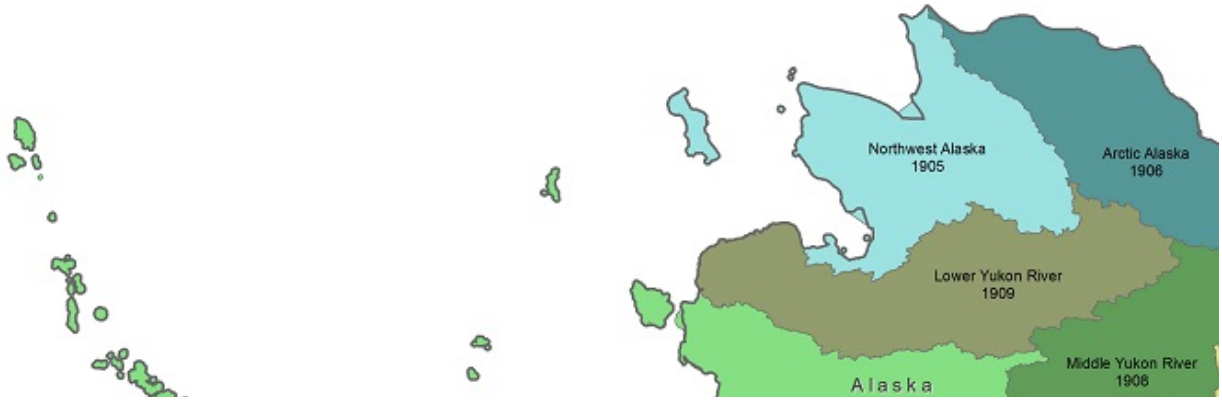
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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
- [ ] 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

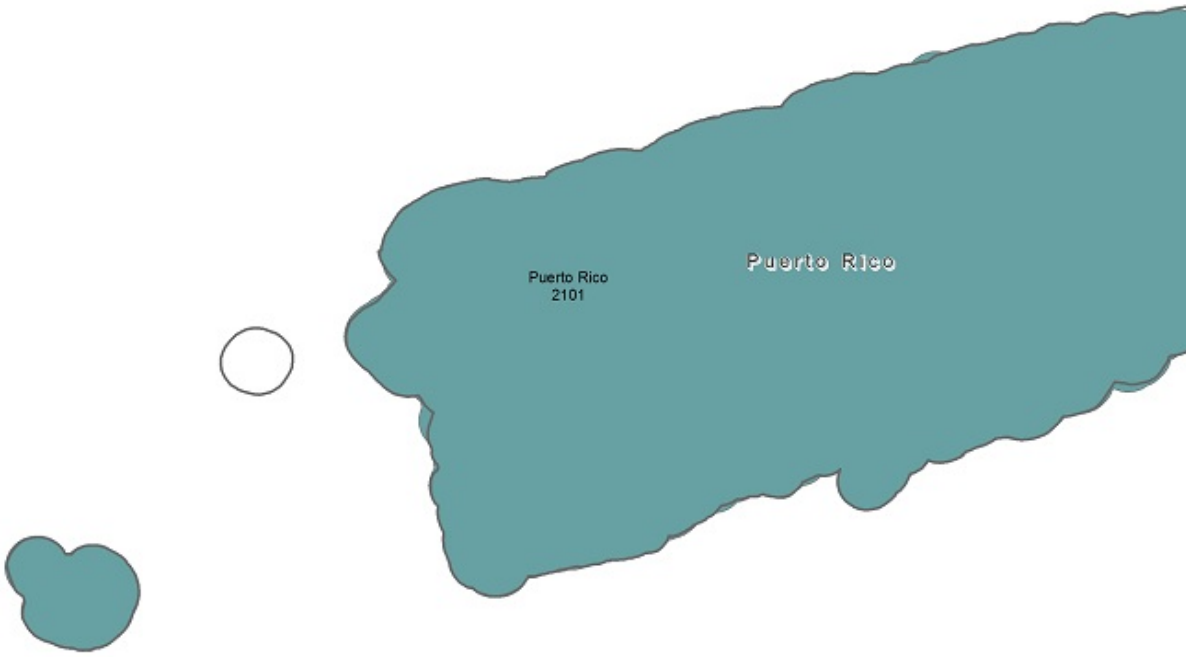
Question 24c20. 20 Hawai'i

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.

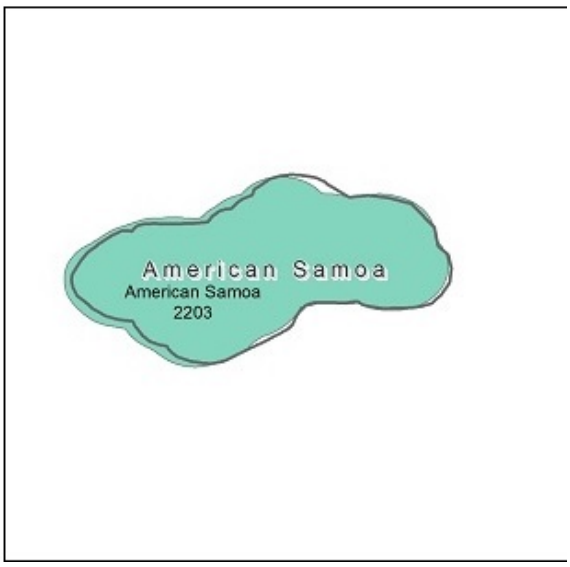


- [ ] 2101 - Puerto Rico
- [ ] 2102 - Virgin Islands
- [ ] All codes

Question 24c22. 22 Pacific Islands

Question 24c2. 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 24d. If your inland geographic area requirements pertain to Federally-owned or Tribal lands, please designate below. Please select all that are required.**

- [ ] All Federally owned lands
- [ ] All lands of U.S. Tribes
- [ ] 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 inland 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 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: 1) Required, 2) Highly desirable, 3) Nice to have, 4) 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 specify):	○	○	○	○
Feature Size: Waterbodies (Reservoirs, lakes, ponds) (Measured by surface area)				
Other (please specify):	○	○	○	○

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

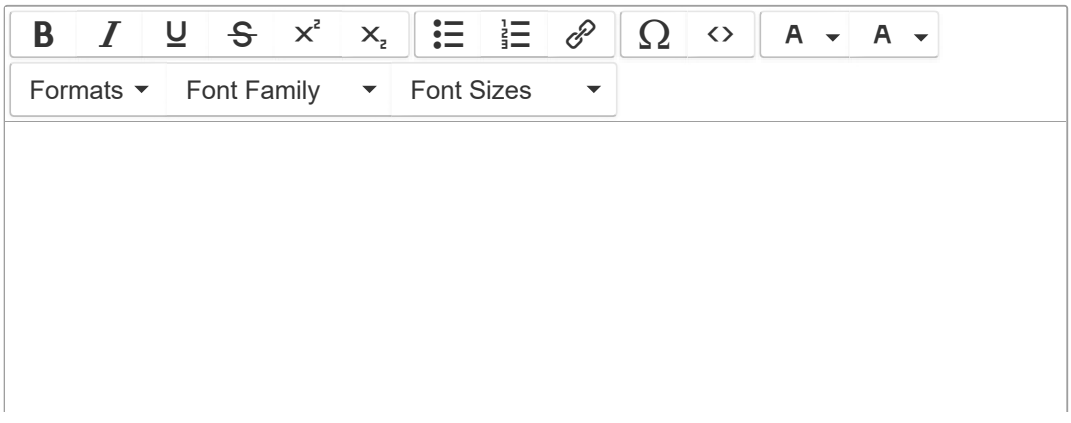
Question 27. What amount of vertical error is acceptable in your inland 3D bathymetric data? In other words, what is the needed Total Vertical Uncertainty (TVU) of your inland 3D bathymetric data at the 95% confidence level? Check one. See FAQ #22 for background information.

- 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

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/m^2	≥0.25 pts/m^2	≥2.0 pts/m^2	≥0.25 pts/m^2	≥0.04 pts/m^2
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: 1) Required, 2) Highly desirable, 3) Nice to have, 4) 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 specify and rat	○	○	○	○
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 specify and rat	○	○	○	○

Question 30b. 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 to your program 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: 1) Required, 2) Highly desirable, 3) Nice to have, 4) 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 specify and rat				
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 specify and rat				

Question 31c. 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. See FAQ #24.

Importance rating: 1) Required, 2) Highly desirable, 3) Nice to have, 4) 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				

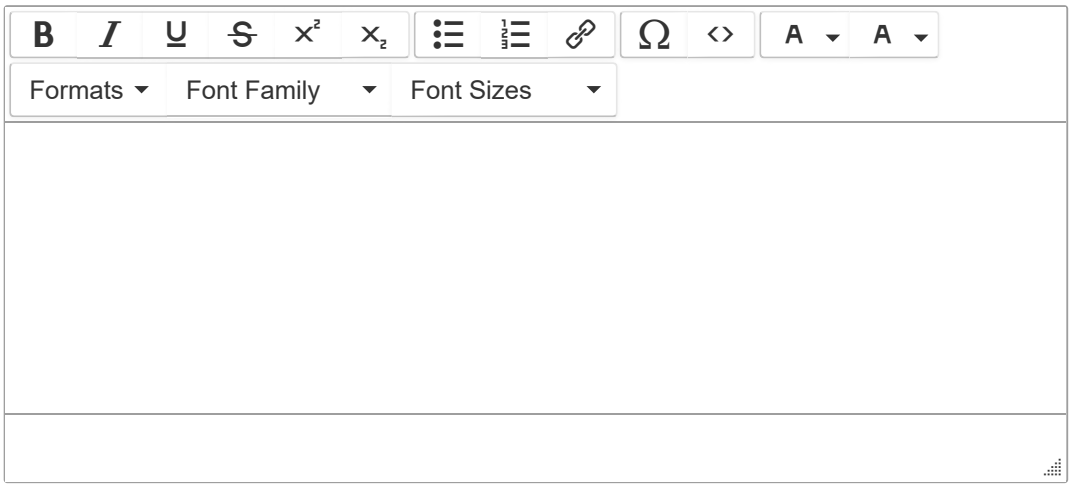
truthing				
Other (please specify and rat				

Question 33. For the Mission Critical Activity that you specified, please describe the importance of integration of your inland bathymetric data with other datasets. For each data type, identify how important the data integration is. 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: 1) Required, 2) Highly desirable, 3) Nice to have, 4) Not required

Data Type	Required	Highly desirable	Nice to have	Not required
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 rat				

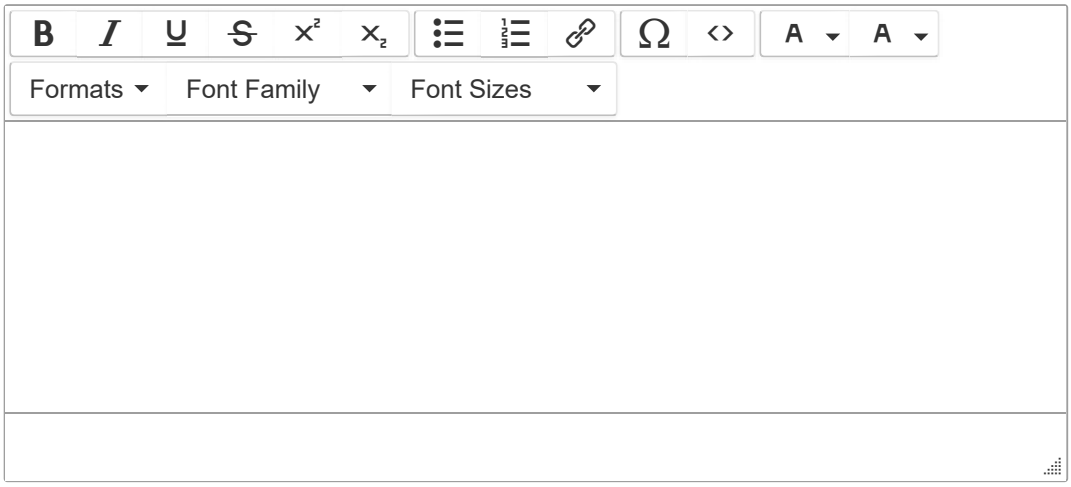
Question 34a. For the inland bathymetry portion of your Mission Critical Activity, please describe the bathymetric data you currently using. Please include information about its Quality Level and date if known. Please include yourself if you are acquiring inland bathymetry. Please enter text. See FAQ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



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 specify):

Question 34b1. Please specify 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 document.

	Major	Moderate	Minor	None	Don't know
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	○	○	○	○	○

Education or outreach	○	○	○	○	○
Environmental benefits	○	○	○	○	○
Public safety, including life and property	○	○	○	○	○
Other (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 document.

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**	
	Major	Moderate	Minor	None	Don't know			
Future Operational Benefits from 3D inland bathymetric data								
Time Savings								
Hours saved from faster and/or avoided field visits/inspections	○	○	○	○	○	Select: ▼		
Hours saved through more efficient modeling, reviews, reporting, data dissemination, mapping, or other procedures	○	○	○	○	○	Select: ▼		
Hours saved from reduced or avoided data manipulation (e.g., combining data from multiple sources; changing projection, datum, etc.)	○	○	○	○	○	Select: ▼		
Hours saved from reduced or avoided data errors	○	○	○	○	○	Select: ▼		
Hours saved through in-office project planning or monitoring	○	○	○	○	○	Select: ▼		

project planning or monitoring

Hours saved from more streamlined operations (e.g., permitting processes, offshore boundary determinations, etc.)	○	○	○	○	○	Select:		
Other (please describe)	○	○	○	○	○	Select:		

	Benefits your program is likely to receive					Dollars Saved	Amount of Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
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	○	○	○	○	○	Select:		
Materials saved (e.g., fertilizer, pesticides, water, irrigation systems, pond design, beach/dune restoration, building/construction materials, etc.)	○	○	○	○	○	Select:		
Other (please describe)	○	○	○	○	○	Select:		

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

	Benefits your program is likely to receive					Dollars Realized/Earned	Amount of Dollars Realized/Earned
	Major	Moderate	Minor	None	Don't know		
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.)	○	○	○	○	○	Select:		
Increased cargo carrying capacity	○	○	○	○	○	Select:		
New products, services, or applications/apps sold	○	○	○	○	○	Select:		
Other (please describe)	○	○	○	○	○	Select:		

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

	Benefits your program is likely to receive					Hours/Dollars Saved	Amount of Hours/Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
Future Operational Benefits from 3D inland bathymetric data								
Other (please describe in your own words)								
Please describe	○	○	○	○	○	Select:		

	Benefits your program is likely to receive					Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
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.)	○	○	○	○	○	Select:		
Improved accuracy of products or services (e.g. navigation charts, nautical charts, shoreline delineation, flood hazard maps, flood warnings, etc.)	○	○	○	○	○	Select:		
Other (please describe)	○	○	○	○	○	Select:		

	Benefits your program is likely to receive	Hour/Dollar Benefits	Amount of Hours/Dollars

	Benefits your program is likely to receive					Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
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.)	○	○	○	○	○	Select: ▼		
Faster response to an incident or event (e.g., faster access to impacted areas, faster response and recovery operations, improved evacuation plans, etc.)	○	○	○	○	○	Select: ▼		
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.)	○	○	○	○	○	Select: ▼		
Improved customer assistance (e.g., use of data allows virtual view and support via phone, email, chat)	○	○	○	○	○	Select: ▼		
More up to date services or products (e.g., nautical charts, navigation charts, flood hazard maps, etc.)	○	○	○	○	○	Select: ▼		
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.)	○	○	○	○	○	Select: ▼		
Other (please describe)	○	○	○	○	○	Select: ▼		

	Benefits your program is likely to receive					Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
Future Customer Service Benefits from 3D inland bathymetric data Improved Customer Experience								
Increased customer confidence in products or services	○	○	○	○	○	Select: ▼		
New services, tools, or applications/apps	○	○	○	○	○	Select: ▼		
Better data availability (faster downloads, data are all in one place, etc.)	○	○	○	○	○	Select: ▼		

Other (please describe)	○	○	○	○	○	Select: ▼		

	Benefits your program is likely to receive					Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
Future Customer Service Benefits from 3D inland bathymetric data								
Other (please describe in your own words)								
Please describe	○	○	○	○	○	Select: ▼		

	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

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

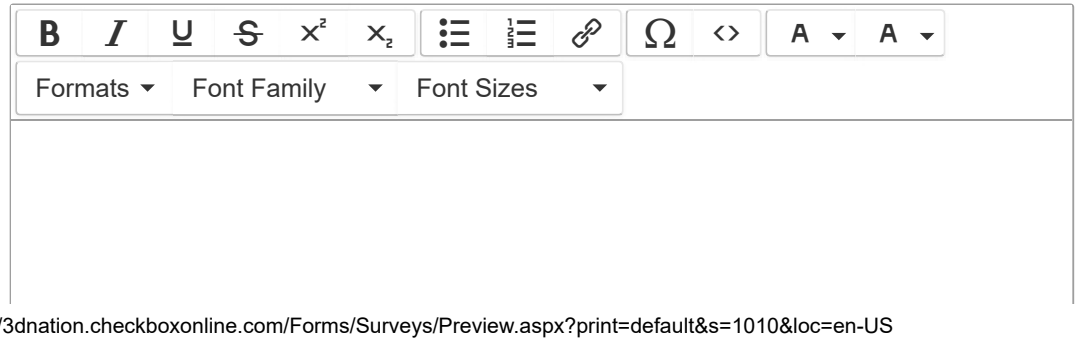
***Question 36c. If the geographic area requirements for 3D bathymetric data for your Mission Critical Activity are for the nearshore areas along the coast of one or more states or counties (including Great Lakes states), please check the state(s) below that are required. After you select the state(s)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

- [ ] Alabama
- [ ] Alaska
- [ ] American Samoa
- [ ] California
- [ ] Connecticut
- [ ] Delaware
- [ ] Federated States of Micronesia
- [ ] Florida
- [ ] Georgia
- [ ] Guam
- [ ] Hawai'i
- [ ] Illinois
- [ ] Indiana
- [ ] Louisiana
- [ ] Maine
- [ ] Marshall Islands
- [ ] Maryland
- [ ] Massachusetts
- [ ] Michigan
- [ ] Minnesota
- [ ] Mississippi
- [ ] New Hampshire
- [ ] New Jersey
- [ ] New York
- [ ] North Carolina
- [ ] Northern Mariana Islands
- [ ] Ohio
- [ ] Oregon
- [ ] Palau
- [ ] Pennsylvania
- [ ] Puerto Rico
- [ ] Rhode Island
- [ ] South Carolina
- [ ] Texas
- [ ] U.S. Minor Outlying Islands
- [ ] U.S. Virgin Islands
- [ ] Virginia
- [ ] Washington
- [ ] Washington, D.C.
- [ ] Wisconsin

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).

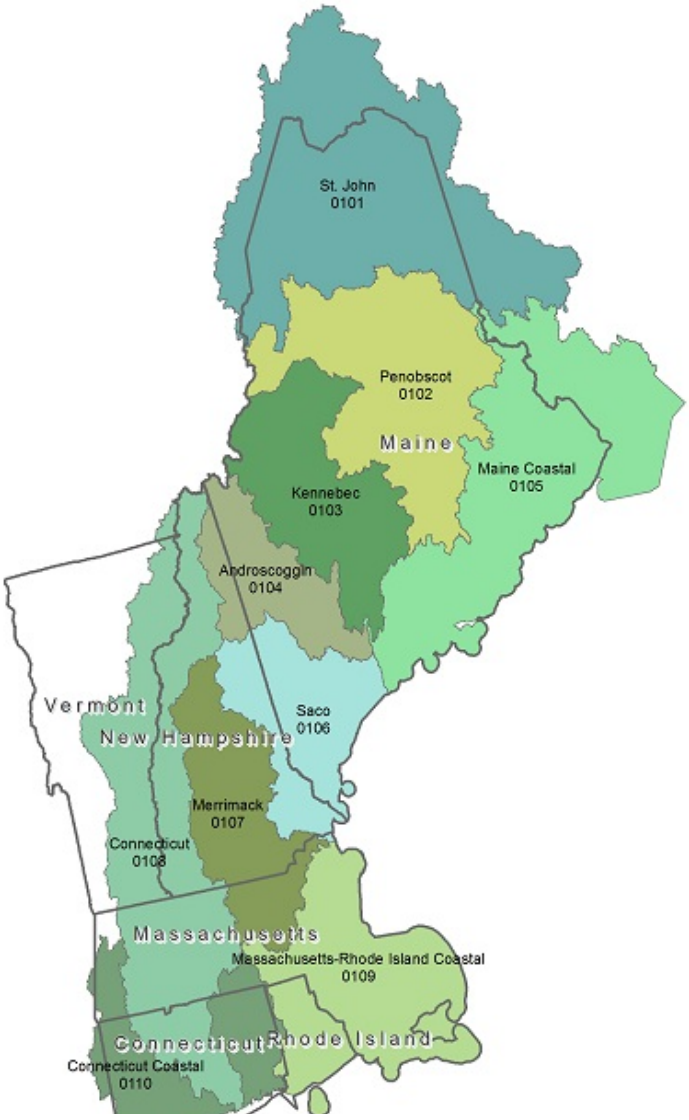


*Question 36d. If your geographic area requirements pertain to the nearshore areas along the coast (including the Great Lakes) of one or more hydrologic units (HUs), please check the appropriate hydrologic region(s) (2-digit HUs) below. This will lead you to select individual 4-digit HUs nested within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

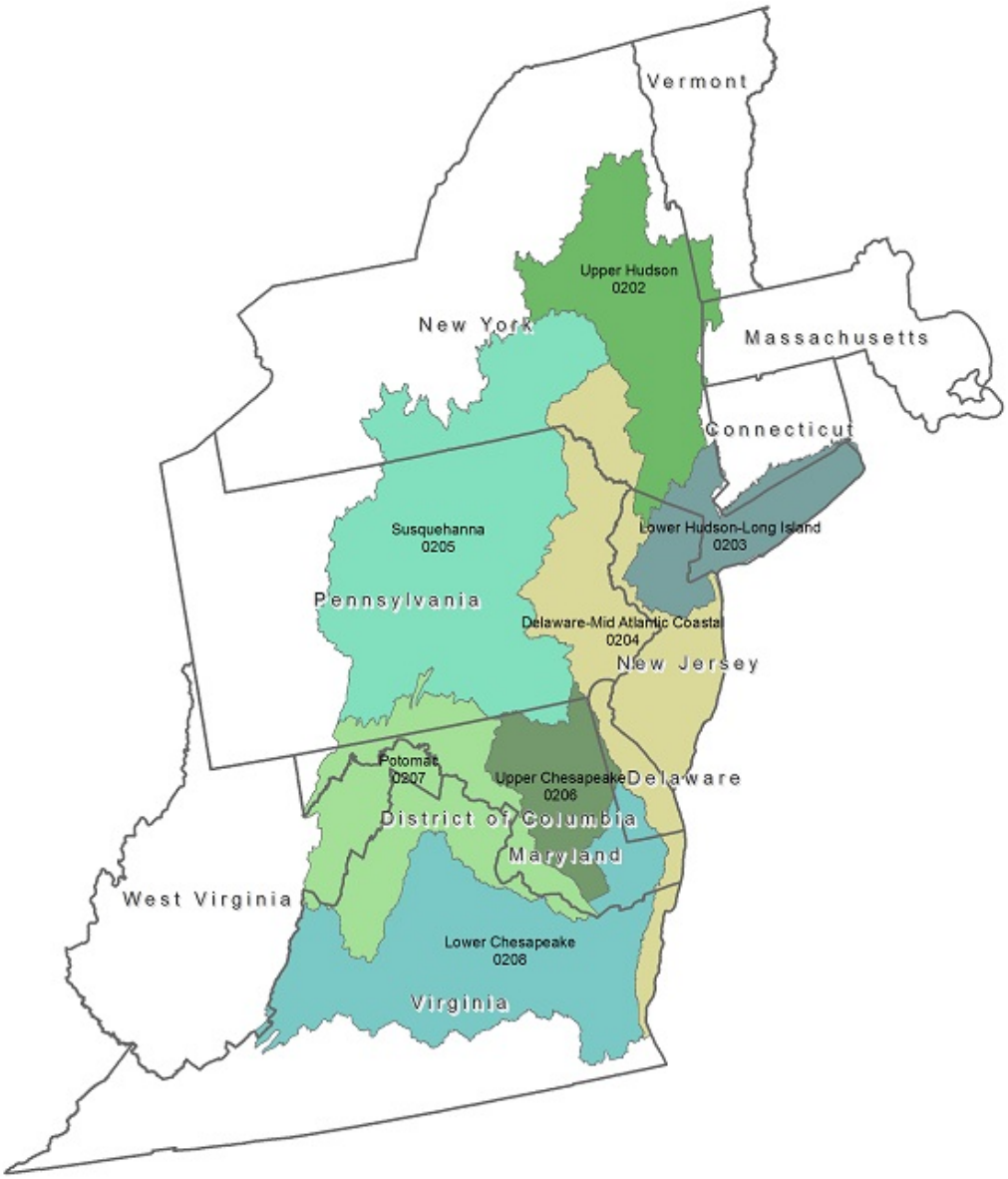
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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.

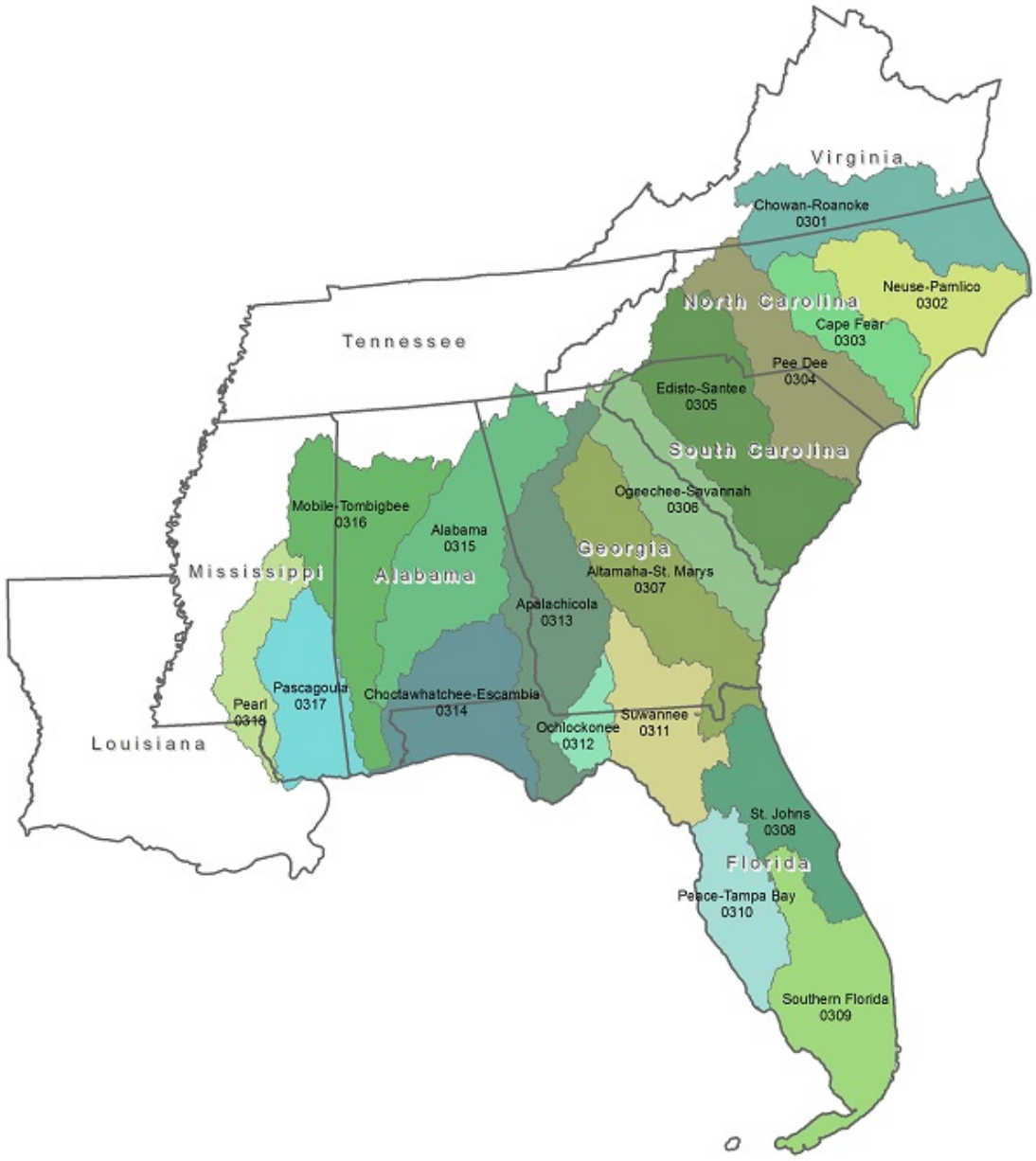


- [ ] 0202 - Upper Hudson
- [ ] 0206 - Upper Chesapeake

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

Question 36d3. 03 South Atlantic-Gulf

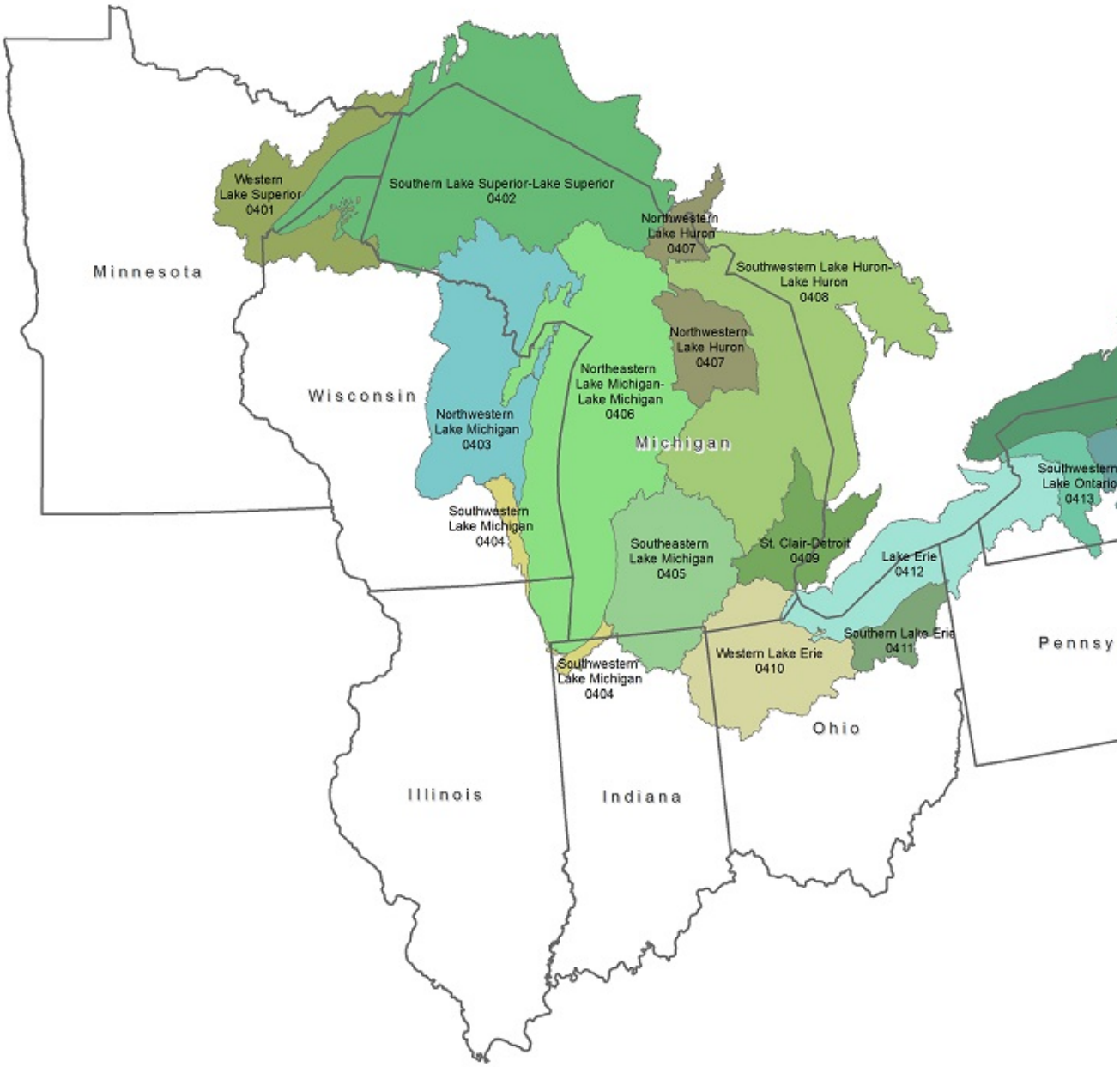
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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

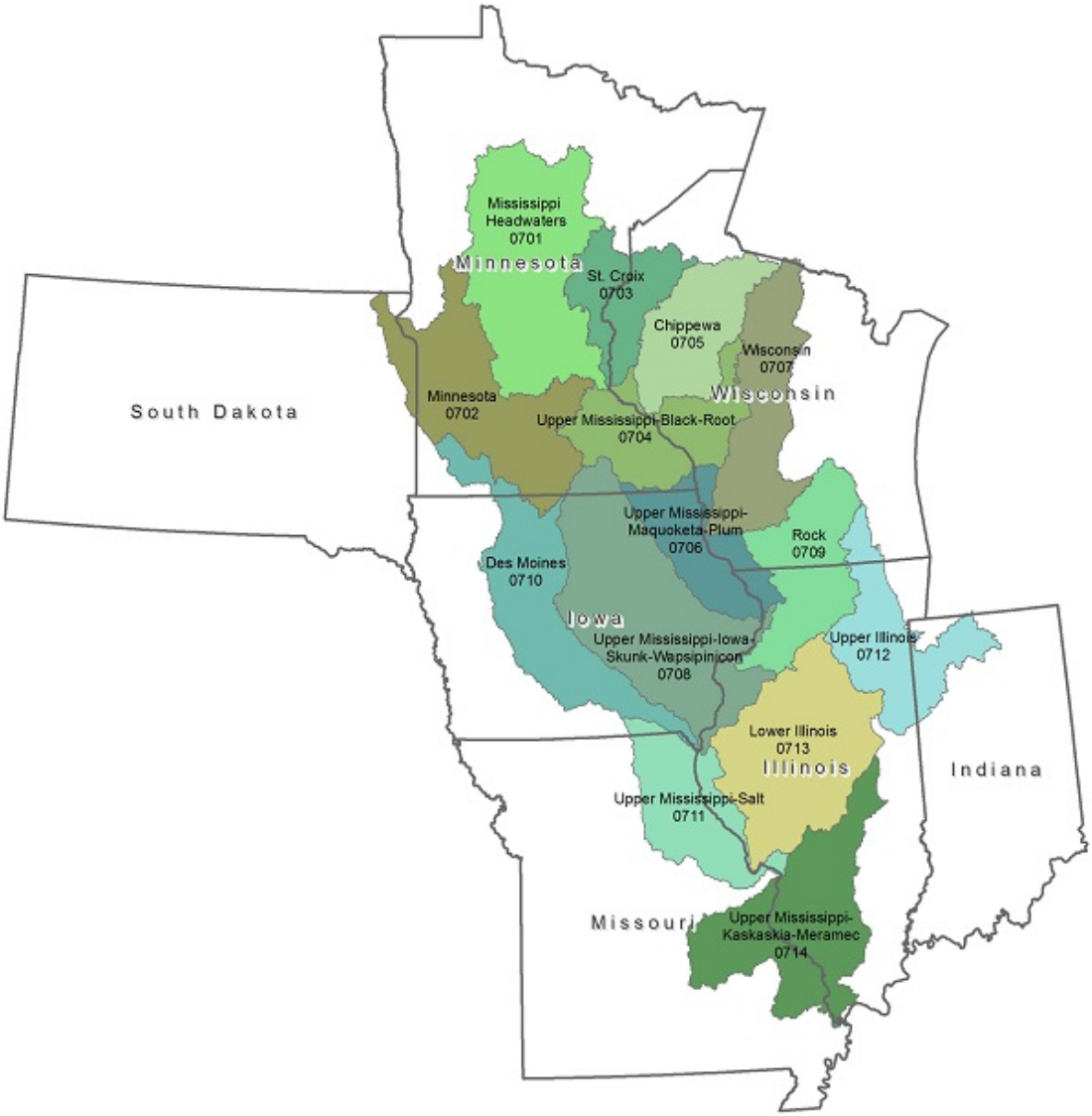
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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

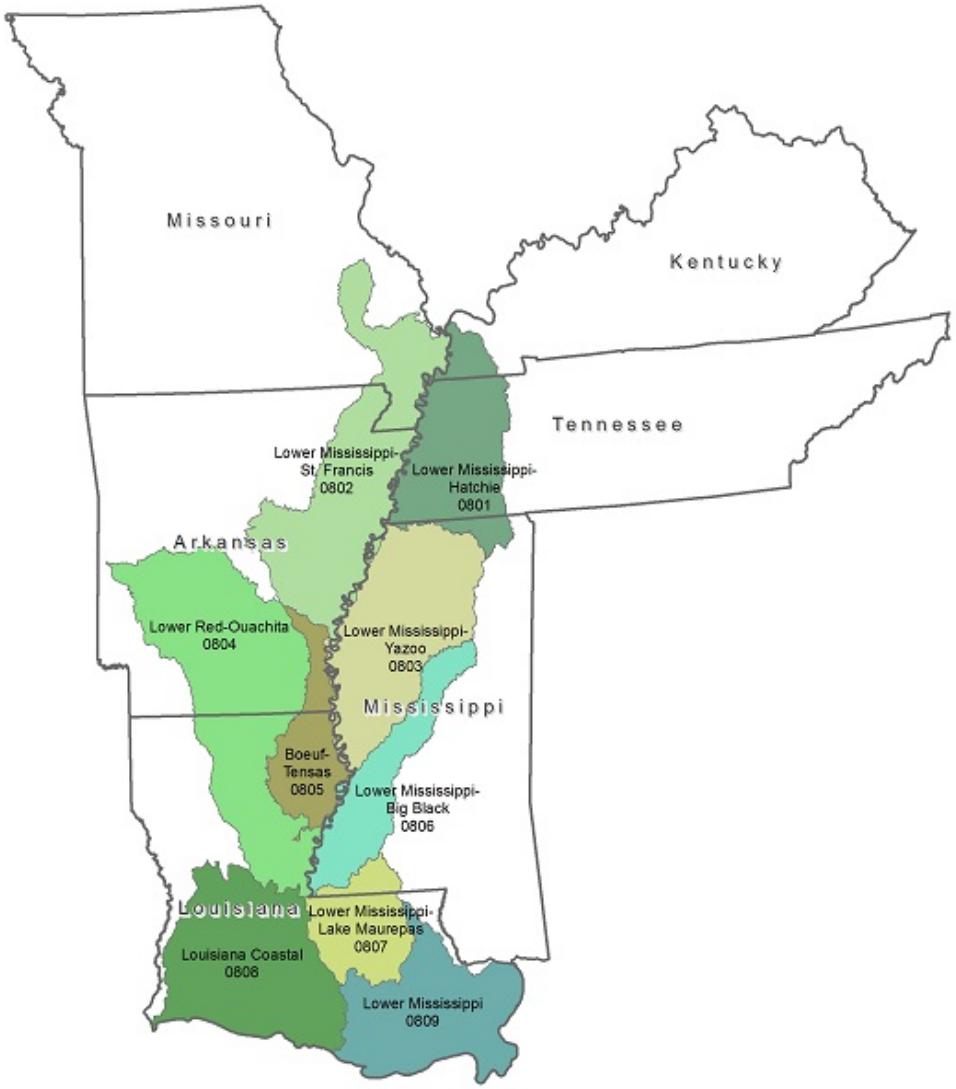
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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

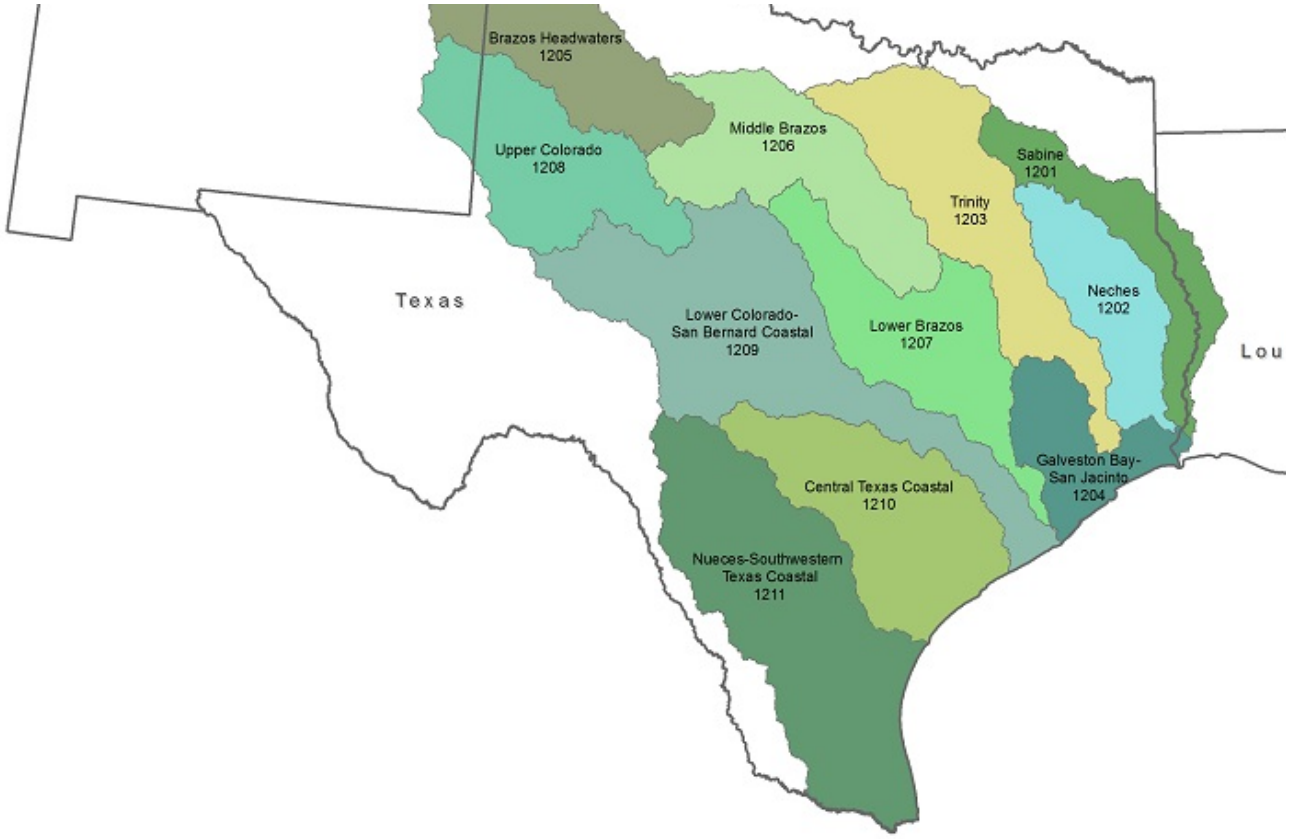
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0801 - Lower Mississippi-Hatchie
- [ ] 0802 - Lower Mississippi-St. Francis
- [ ] 0803 - Lower Mississippi-Yazoo
- [ ] 0804 - Lower Red-Ouachita
- [ ] 0805 - Boeuf-Tensas
- [ ] 0806 - Lower Mississippi-Big Black
- [ ] 0807 - Lower Mississippi-Lake Maurepas
- [ ] 0808 - Louisiana Coastal
- [ ] 0809 - Lower Mississippi
- [ ] All codes

Question 36d7. 12 Texas – Gulf

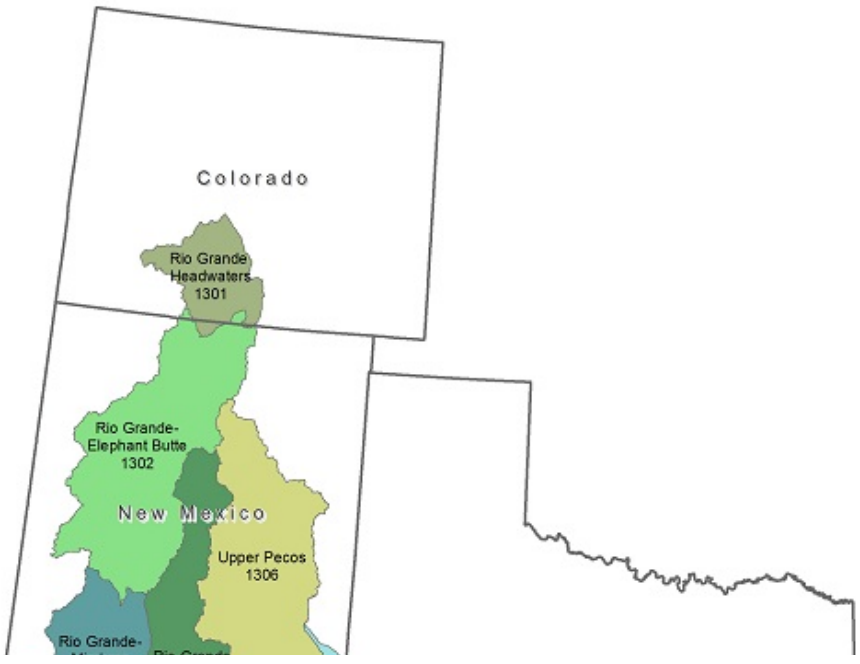
Please select individual HUC-4 codes for your specific hydrologic units.

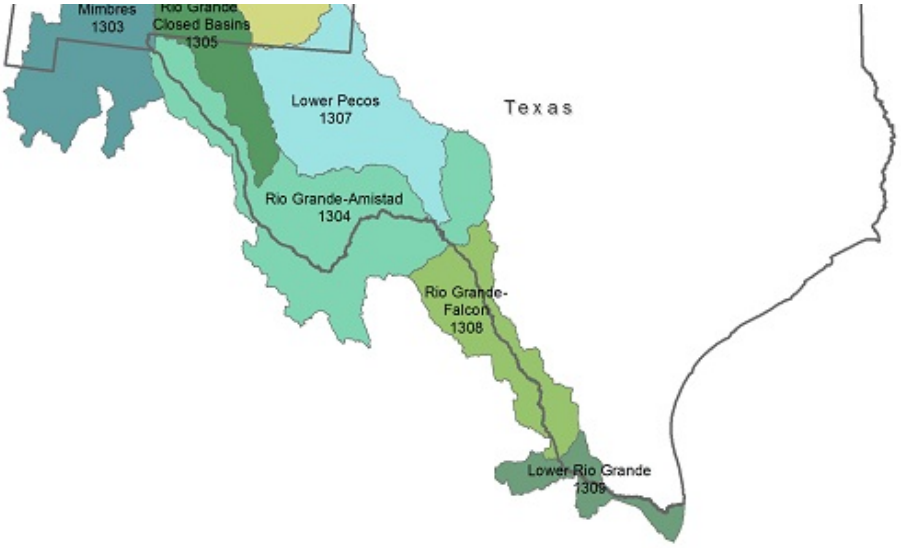


- [ ] 1201 - Sabine
- [ ] 1202 - Neches
- [ ] 1203 - Trinity
- [ ] 1204 - Galveston Bay-San Jacinto
- [ ] 1205 - Brazos Headwaters
- [ ] 1206 - Middle Brazos
- [ ] 1207 - Lower Brazos
- [ ] 1208 - Upper Colorado
- [ ] 1209 - Lower Colorado-San Bernard Coastal
- [ ] 1210 - Central Texas Coastal
- [ ]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

Question 36d8. 13 Rio Grande

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

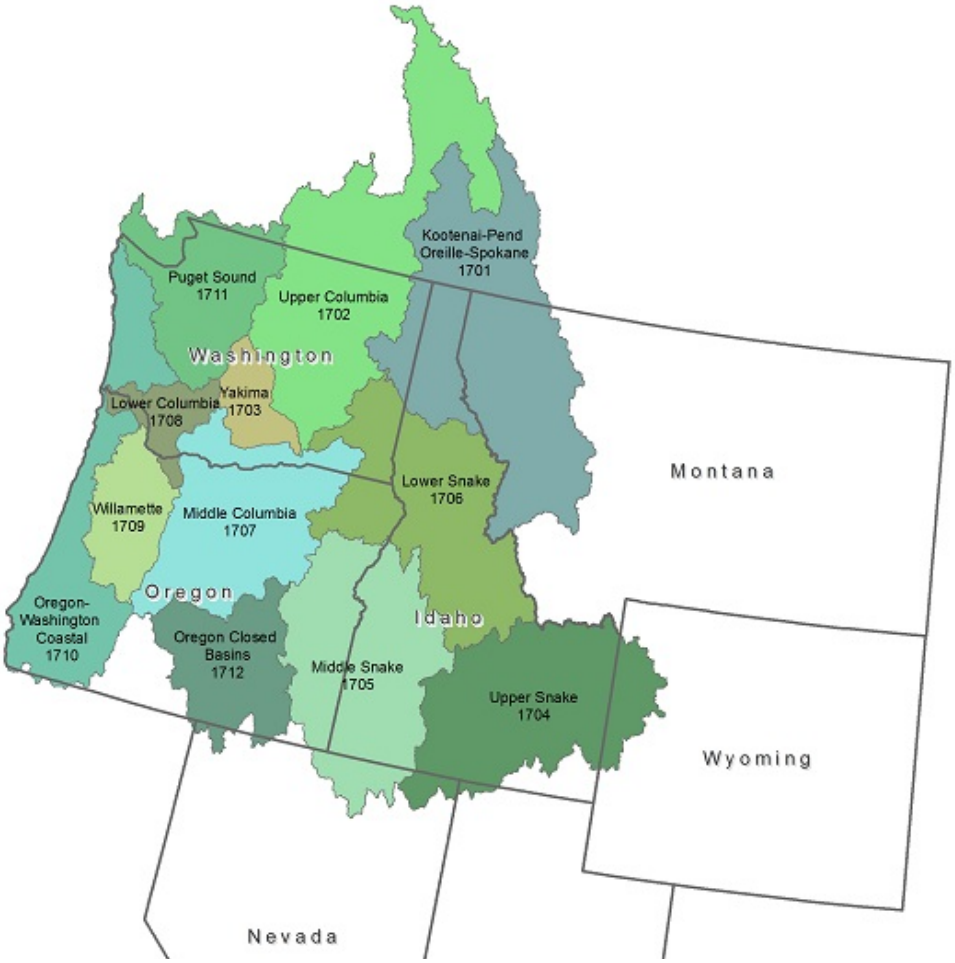


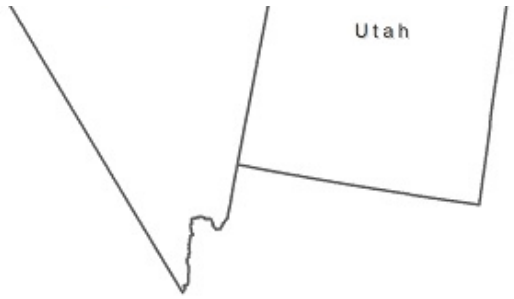


- [ ] 1301 - Rio Grande Headwaters
- [ ] 1302 - Rio Grande-Elephant Butte
- [ ] 1303 - Rio Grande-Mimbres
- [ ] 1304 - Rio Grande-Amistad
- [ ] 1305 - Rio Grande Closed Basins
- [ ] 1306 - Upper Pecos
- [ ] 1307 - Lower Pecos
- [ ] 1308 - Rio Grande-Falcon
- [ ] 1309 - Lower Rio Grande
- [ ] All codes

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

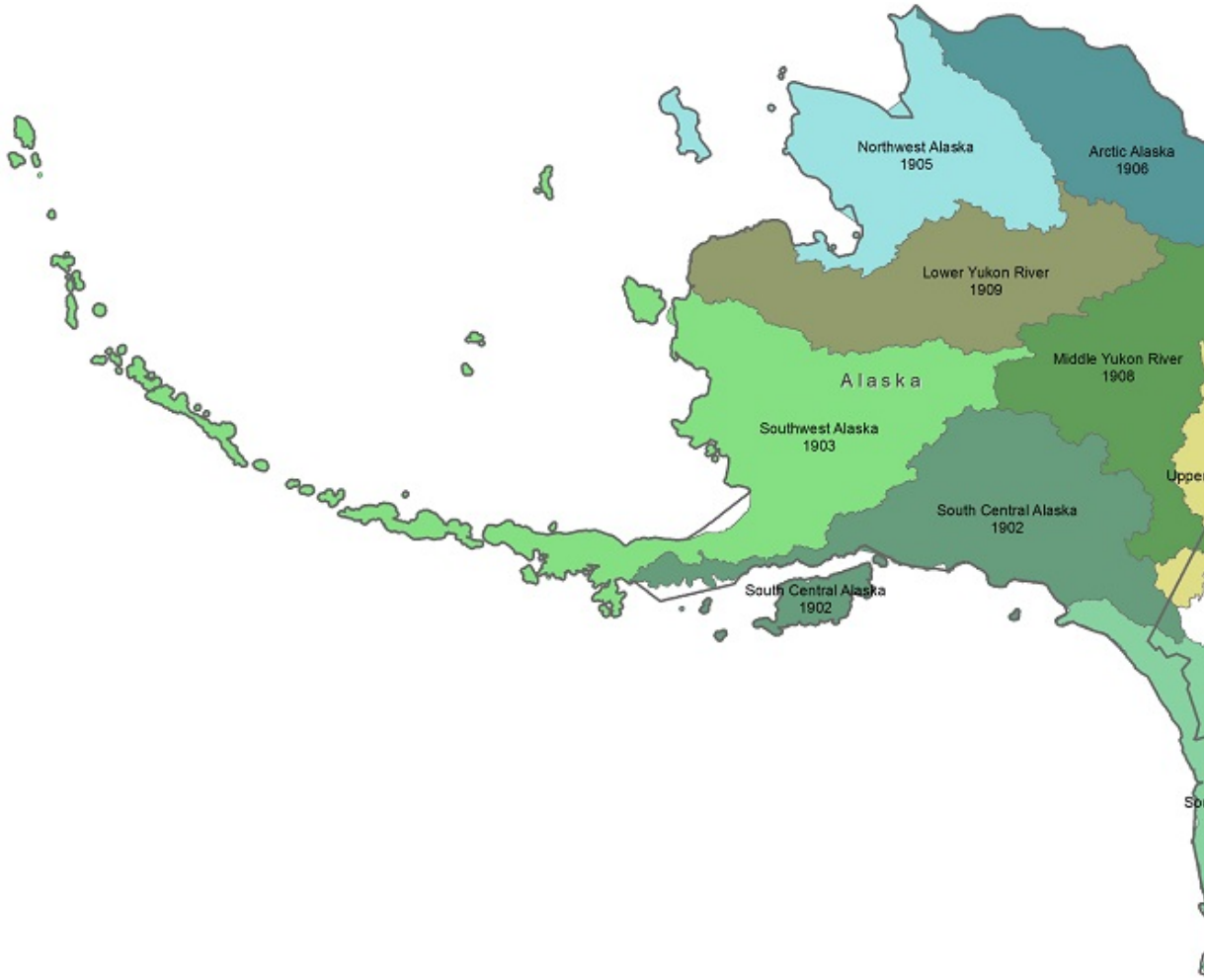
Question 36d10. 18 California

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

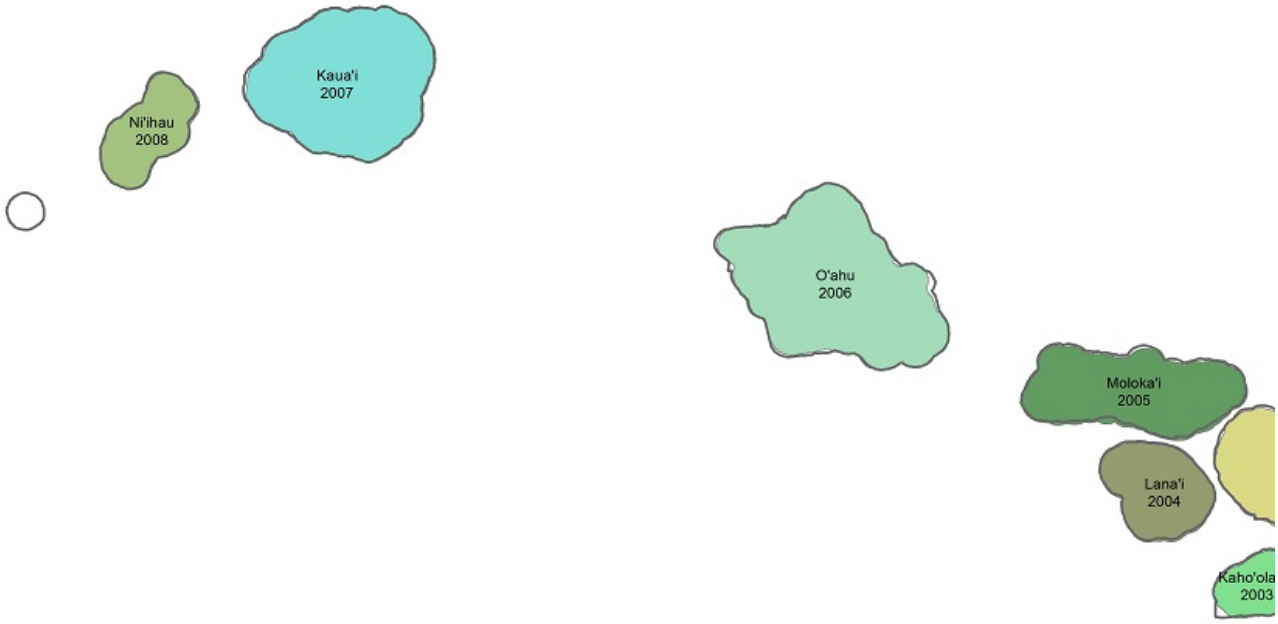
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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

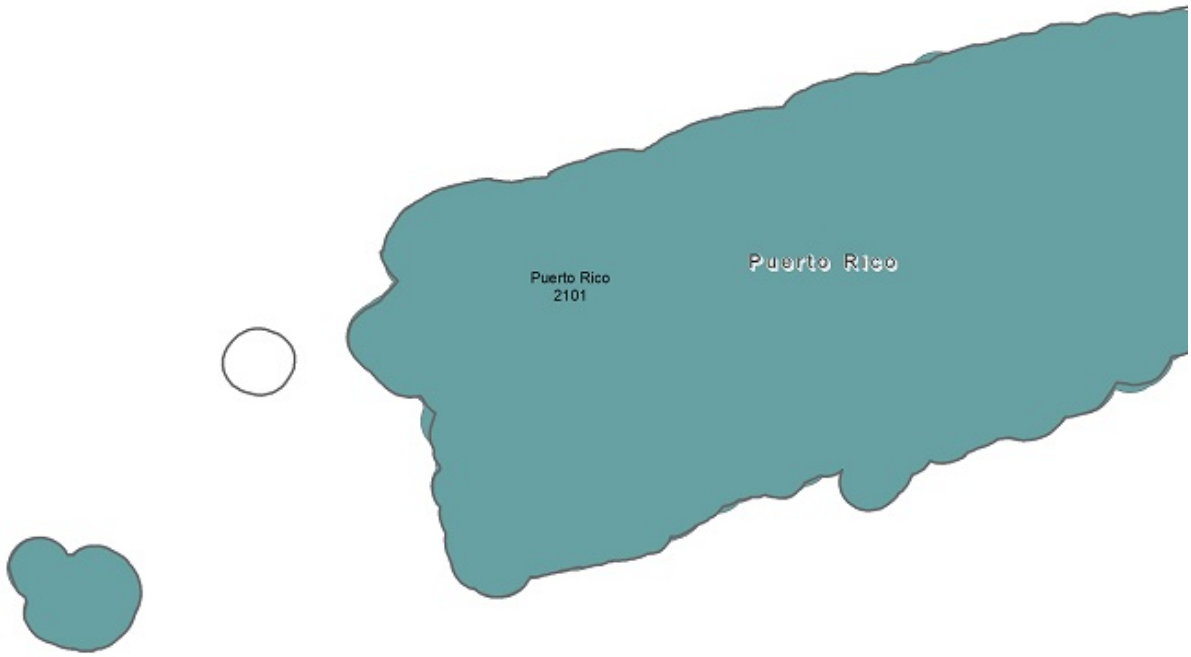
Please select individual HUC-4 codes for your specific hydrologic units.



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

Question 36d13. 21 Caribbean

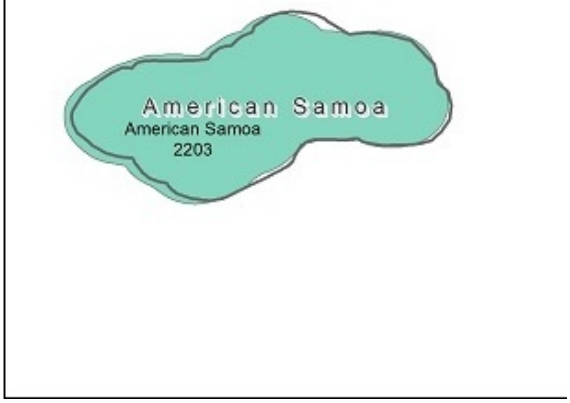
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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
- [ ] All lands of U.S. Tribes
- [ ] 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
- [ ] Monitor
- [ ] Monterey Bay
- [ ] Olympic Coast
- [ ] Papahanaumokuakea
- [ ] Rose Atoll

- [ ] Flower Garden Banks
- [ ] Gray's Reef
- [ ] Greater Farallones
- [ ] Hawaiian Islands Humpback Whale
- [ ] Marianas Trench
- [ ] 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.

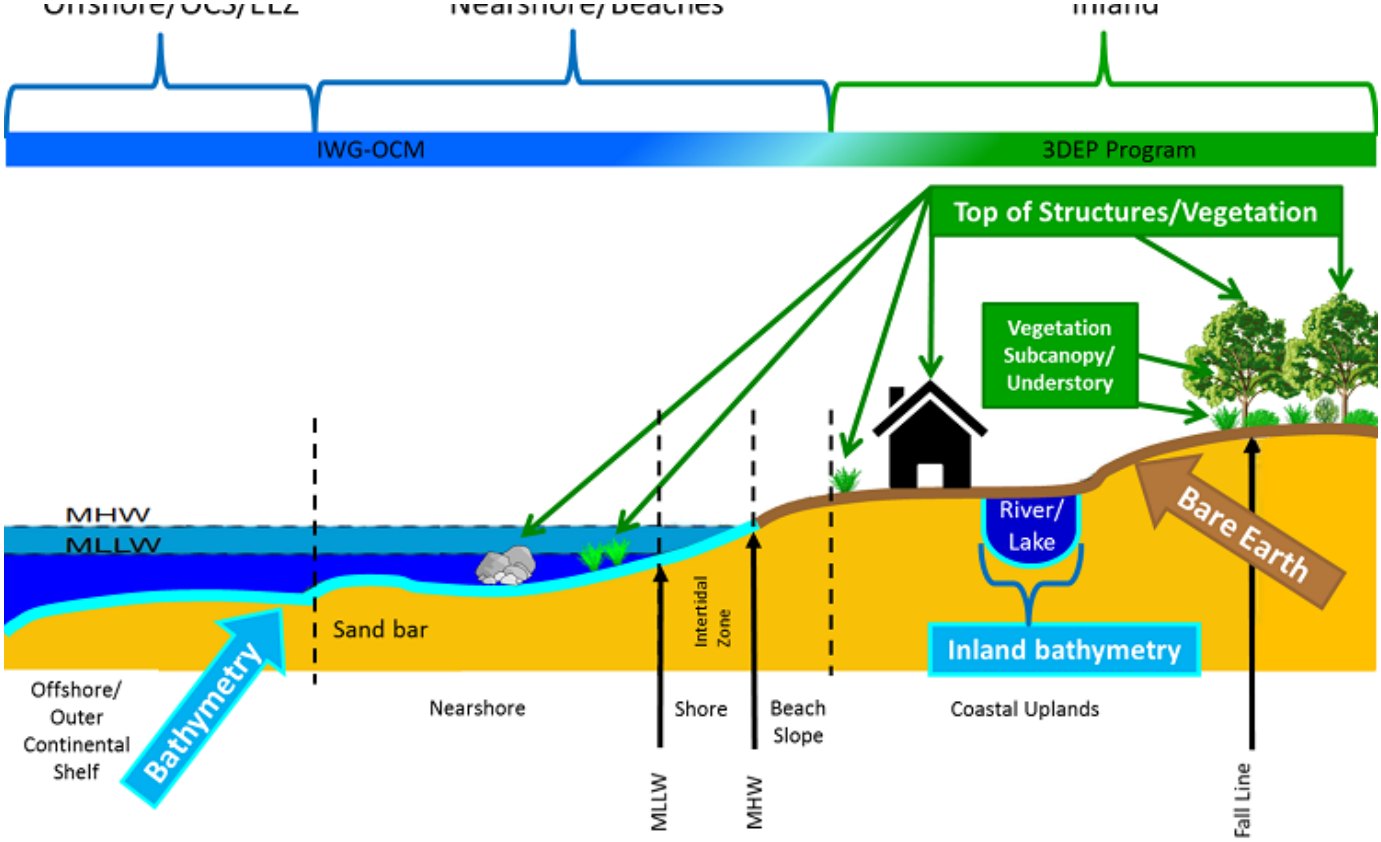
- ( ) Less than 50 cm
- ( ) Up to 1 meter
- ( ) Up to 2 meters
- ( ) Up to 5 meters
- ( ) Up to 10 meters
- ( ) Up to 20 meters
- ( ) Greater than 20 meters
- ( ) The best horizontal accuracy achievable for the vertical accuracy I need
- ( ) I don't know

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.

Offshore/OCS/EEZ Nearshore/Beaches Inland



- 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 specify):

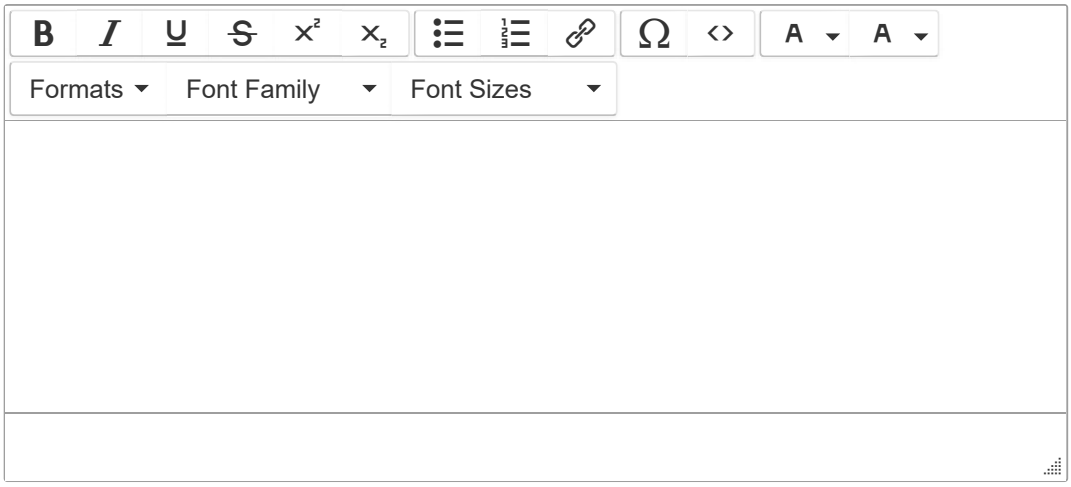
Question 39b. How far down the beach profile do you need 3D bathymetric data to support your Mission Critical Activity? Check only one. See FAQ #9.

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

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/m^2	≥0.25 pts/m^2	≥2.0 pts/m^2	≥0.25 pts/m^2	≥0.04 pts/m^2
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 specify):

Question 42. For the nearshore portion of your Mission Critical Activity, do the Quality Level 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 specify):

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: 1) Required, 2) Highly desirable, 3) Nice to have, 4) 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 specify and rat	○	○	○	○
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 specify and rat	○	○	○	○

Question 44b. 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. See FAQ #24.

Importance rating: 1) Required, 2) Highly desirable, 3) Nice to have, 4) 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 specify and rat				

Question 46. For the Mission Critical Activity that you specified, please describe the importance of integration of your nearshore 3D bathymetric data with other datasets. For each data type, identify how important the data integration is. 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: 1) Required, 2) Highly desirable, 3) Nice to have, 4) 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 specify and rat	○	○	○	○

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.

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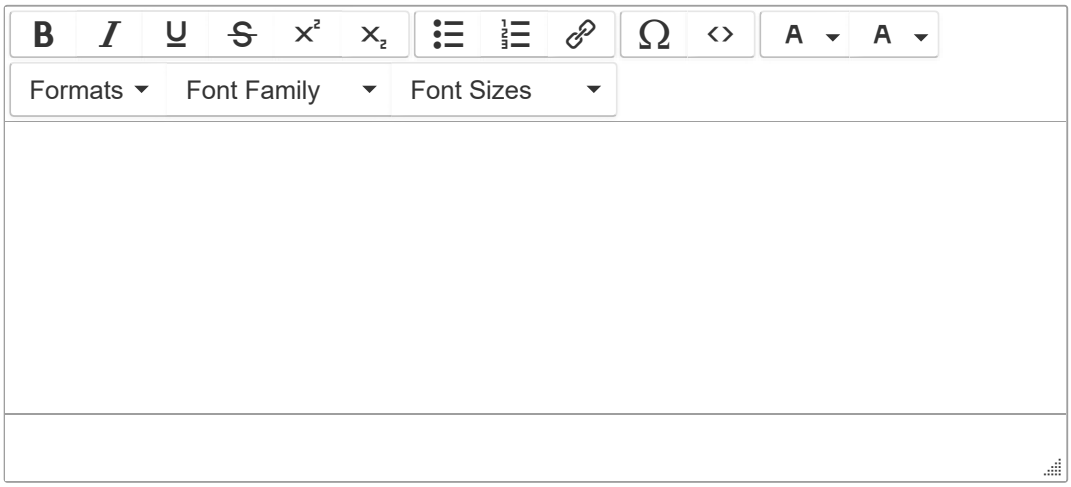
Formats Font Family Font Sizes

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 specify):

Question 47b1. Please specify 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 document.

	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)	○	○	○	○	○

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 document.

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	
	Major	Moderate	Minor	None	Don't know			
Future Operational Benefits from 3D nearshore bathymetric data								
Time Savings								
Hours saved from faster and/or avoided field visits/inspections.	○	○	○	○	○	Select: ▼		
Hours saved through more efficient modeling, reviews, reporting, data dissemination, mapping, or other procedures	○	○	○	○	○	Select: ▼		
Hours saved from reduced or avoided data manipulation (e.g., combining data from multiple sources; changing projection, datum, etc.)	○	○	○	○	○	Select: ▼		
Hours saved from reduced or avoided data errors	○	○	○	○	○	Select: ▼		
Hours saved through in-office project planning or monitoring	○	○	○	○	○	Select: ▼		
Hours saved from more streamlined operations (e.g., permitting processes, offshore boundary determinations, etc.)	○	○	○	○	○	Select: ▼		
Other (please describe)	○	○	○	○	○	Select: ▼		

	Benefits your program is likely to receive					Dollars Saved	Amount of Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
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	○	○	○	○	○	Select:		
Materials saved (e.g., fertilizer, pesticides, water, irrigation systems, pond design, beach/dune restoration, building/construction materials, etc.)	○	○	○	○	○	Select:		
Other (please describe)	○	○	○	○	○	Select:		

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

	Benefits your program is likely to receive					Dollars Realized/Earned	Amount of Dollars Realized/Earned	
	Major	Moderate	Minor	None	Don't know			
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.)	○	○	○	○	○	Select:		
Increased cargo carrying capacity	○	○	○	○	○	Select:		
New products, services, or								

applications/apps sold	○	○	○	○	○	Select: ▼		
Other (please describe)	○	○	○	○	○	Select: ▼		

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

	Benefits your program is likely to receive					Hours/Dollars Saved	Amount of Hours/Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
Future Operational Benefits from 3D nearshore bathymetric data								
Please describe	○	○	○	○	○	Select: ▼		

	Benefits your program is likely to receive					Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
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.)	○	○	○	○	○	Select: ▼		
Improved accuracy of products or services (e.g. navigation charts, nautical charts, shoreline delineation, flood hazard maps, flood warnings, etc.)	○	○	○	○	○	Select: ▼		
Other (please describe)	○	○	○	○	○	Select: ▼		

	Benefits your program is likely to receive					Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
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	○	○	○	○	○	Select: ▼		

determinations, etc.)

	Major	Moderate	Minor	None	Don't know	Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
Faster response to an incident or event (e.g., faster access to impacted areas, faster response and recovery operations, improved evacuation plans, etc.)	○	○	○	○	○	Select: ▼		
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.)	○	○	○	○	○	Select: ▼		
Improved customer assistance (e.g., use of data allows virtual view and support via phone, email, chat)	○	○	○	○	○	Select: ▼		
More up to date services or products (e.g., nautical charts, navigation charts, flood hazard maps, etc.)	○	○	○	○	○	Select: ▼		
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.)	○	○	○	○	○	Select: ▼		
Other (please describe)	○	○	○	○	○	Select: ▼		

	Benefits your program is likely to receive: Major	Moderate	Minor	None	Don't know	Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
Future Customer Service Benefits from 3D nearshore bathymetic data								
Improved Customer Experience								
Increased customer confidence in products or services	○	○	○	○	○	Select: ▼		
New services, tools, or applications/apps	○	○	○	○	○	Select: ▼		
Better data availability (faster downloads, data are all in one place, etc.)	○	○	○	○	○	Select: ▼		
Other (please describe)	○	○	○	○	○	Select: ▼		

	Benefits your program is likely to receive: Major	Moderate	Minor	None	Don't know	Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
Future Customer Service Benefits from 3D nearshore bathymetric data								
Other (please describe in your own words)								

Other (please describe in your own words)

Please describe	○	○	○	○	○	Select: ▼	

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

Part 3.4 - Questions for Offshore Requirements

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

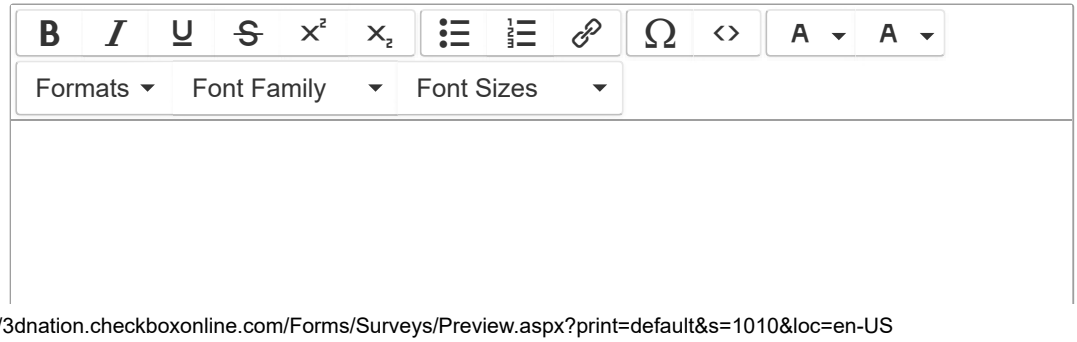
***Question 49c. If the geographic area requirements for 3D bathymetric data for your Mission Critical Activity are for areas offshore of one or more states or counties (including Great Lakes states), please check the state(s) below that are required. After you select the state(s) you will be allowed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

- [ ] Alabama
- [ ] Alaska
- [ ] American Samoa
- [ ] California
- [ ] Connecticut
- [ ] Delaware
- [ ] Federated States of Micronesia
- [ ] Florida
- [ ] Georgia
- [ ] Guam
- [ ] Hawai'i
- [ ] Illinois
- [ ] Indiana
- [ ] Louisiana
- [ ] Maine
- [ ] Marshall Islands
- [ ] Maryland
- [ ] Massachusetts
- [ ] Michigan
- [ ] Minnesota
- [ ] Mississippi
- [ ] New Hampshire
- [ ] New Jersey
- [ ] New York
- [ ] North Carolina
- [ ] Northern Mariana Islands
- [ ] Ohio
- [ ] Oregon
- [ ] Palau
- [ ] Pennsylvania
- [ ] Puerto Rico
- [ ] Rhode Island
- [ ] South Carolina
- [ ] Texas
- [ ] U.S. Minor Outlying Islands
- [ ] U.S. Virgin Islands
- [ ] Virginia
- [ ] Washington
- [ ] Washington, D.C.
- [ ] Wisconsin

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).

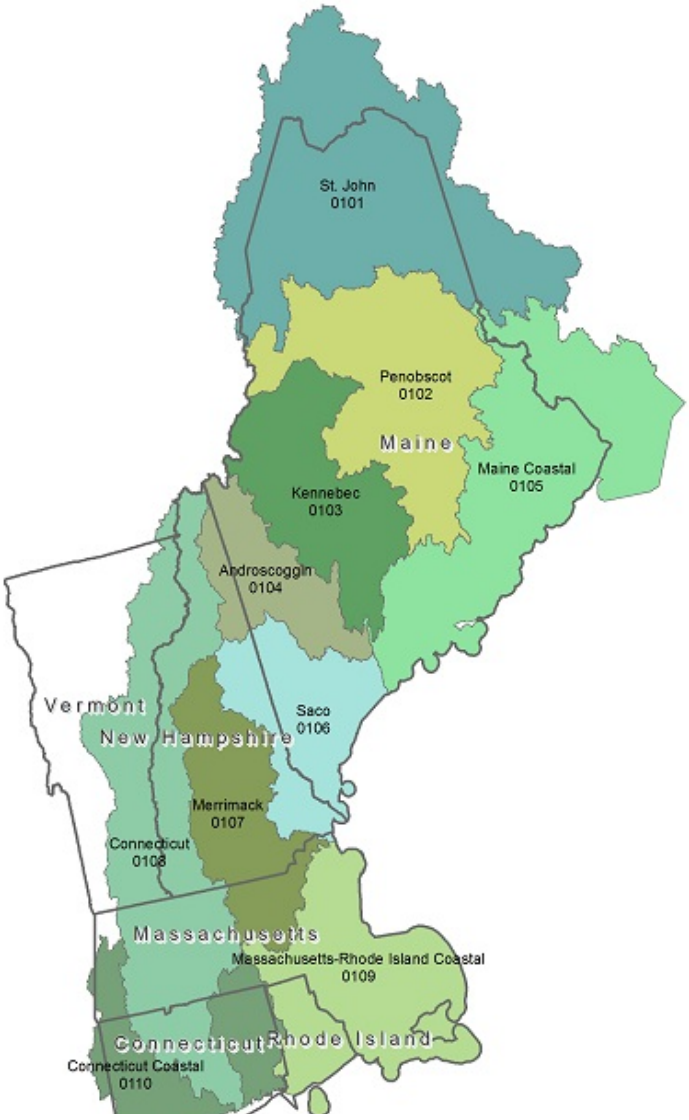


*Question 49d. If your offshore geographic area requirements pertain to areas offshore (including the Great Lakes) of one or more hydrologic units (HUs), please check the appropriate hydrologic region(s) (2-digit HUs) below. This will lead you to select individual 4-digit HUs nested within your hydrologic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

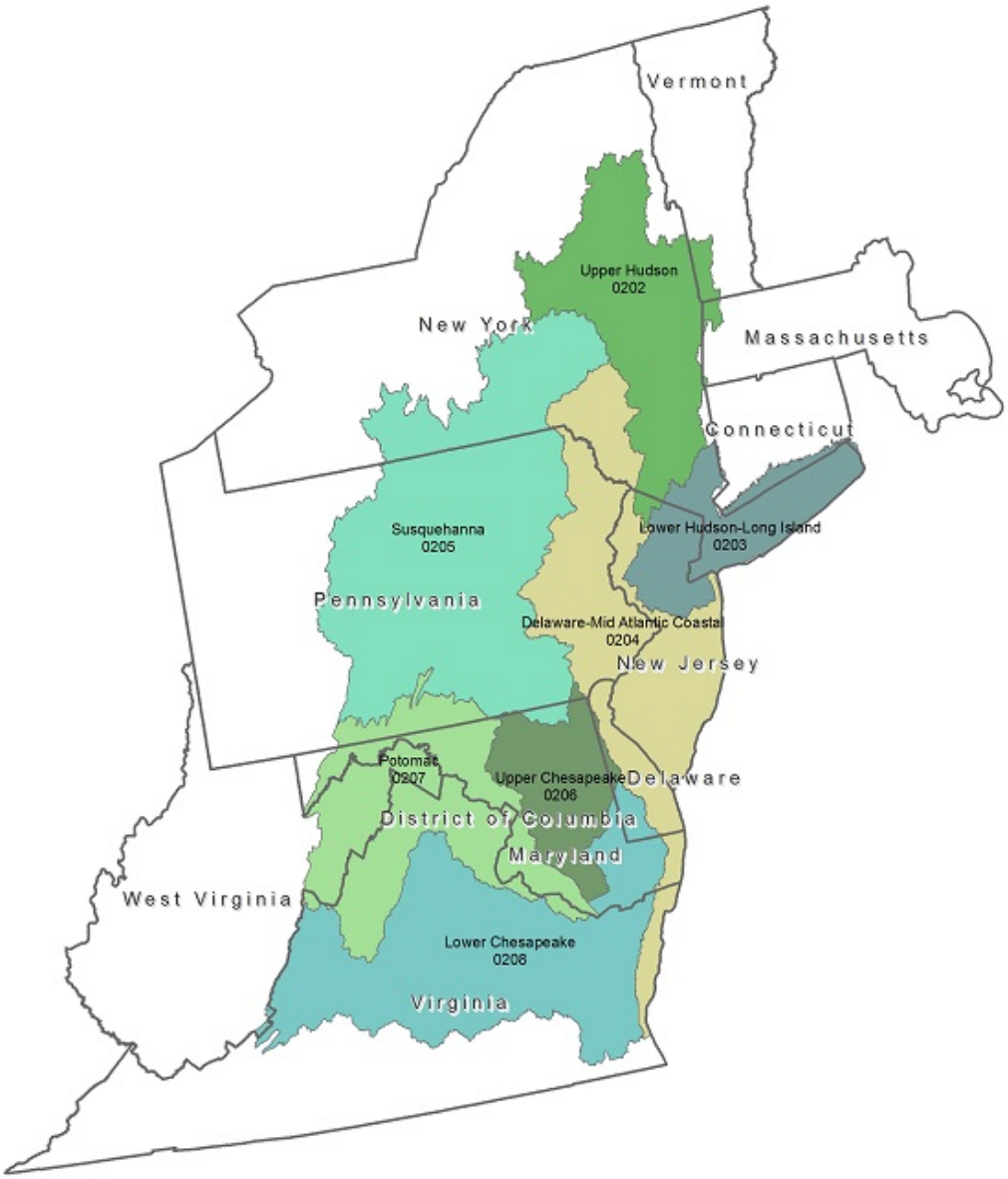
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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.

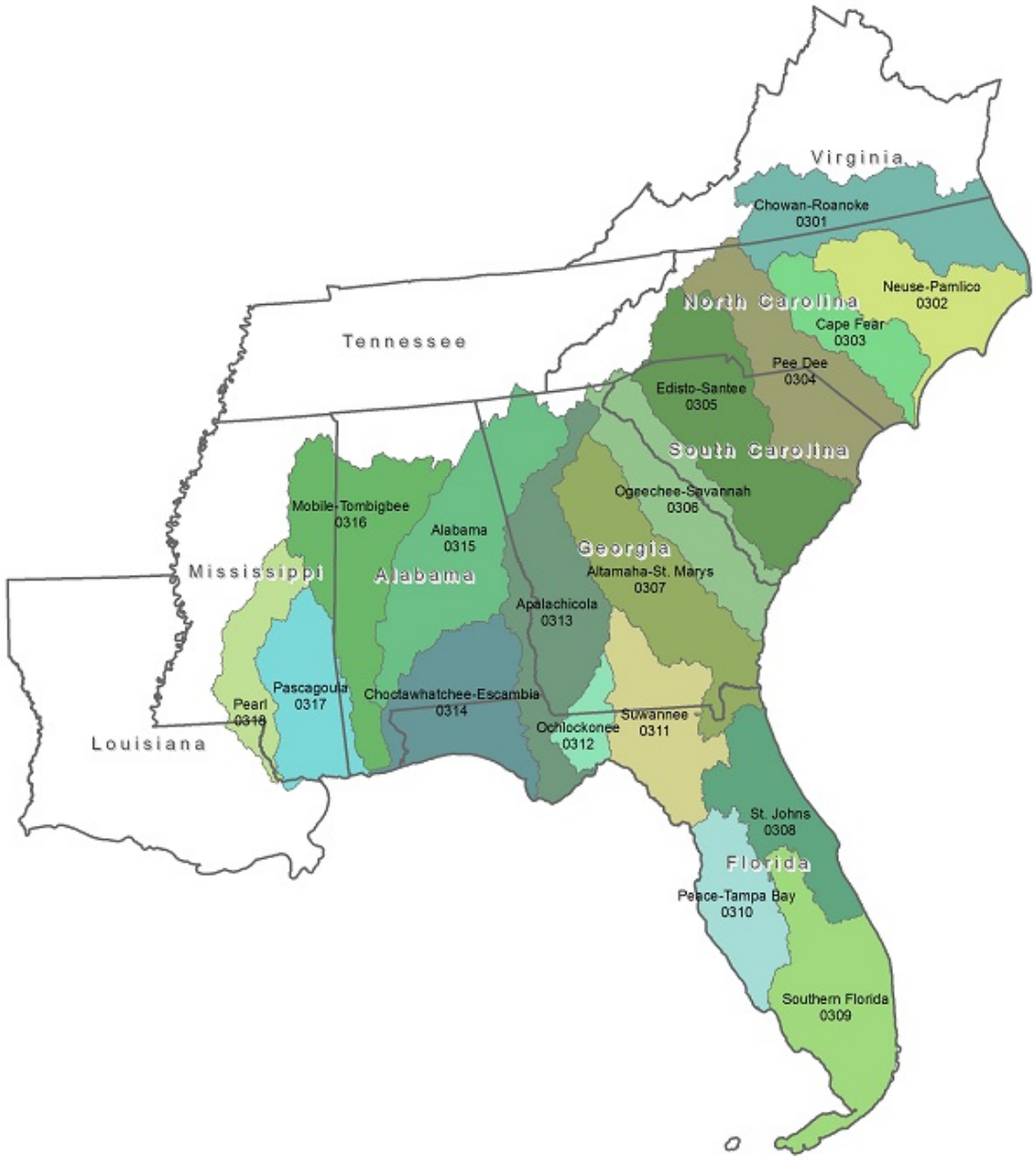


- [ ] 0202 - Upper Hudson
- [ ] 0206 - Upper Chesapeake

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

Question 49d3. 03 South Atlantic-Gulf

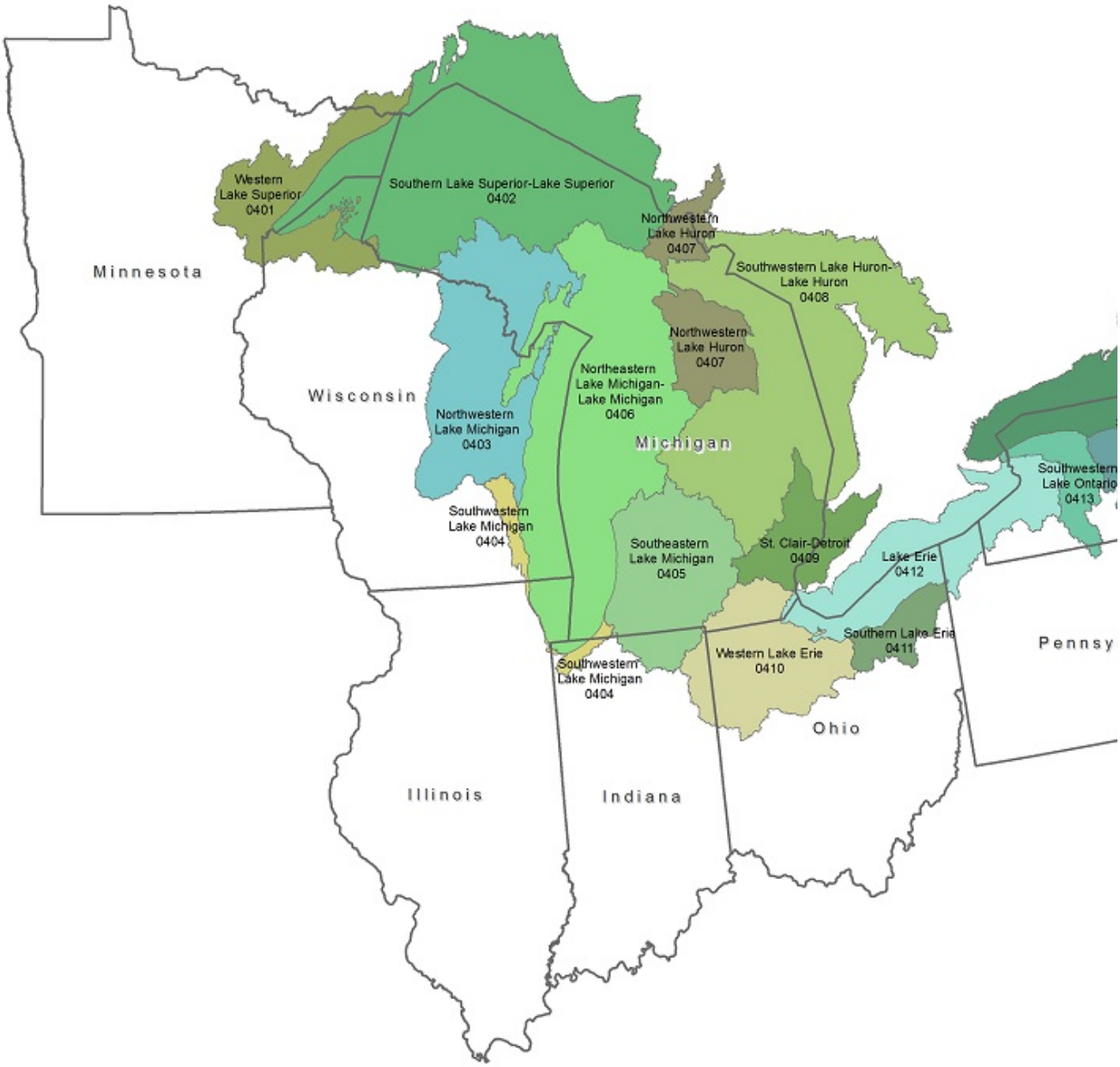
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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

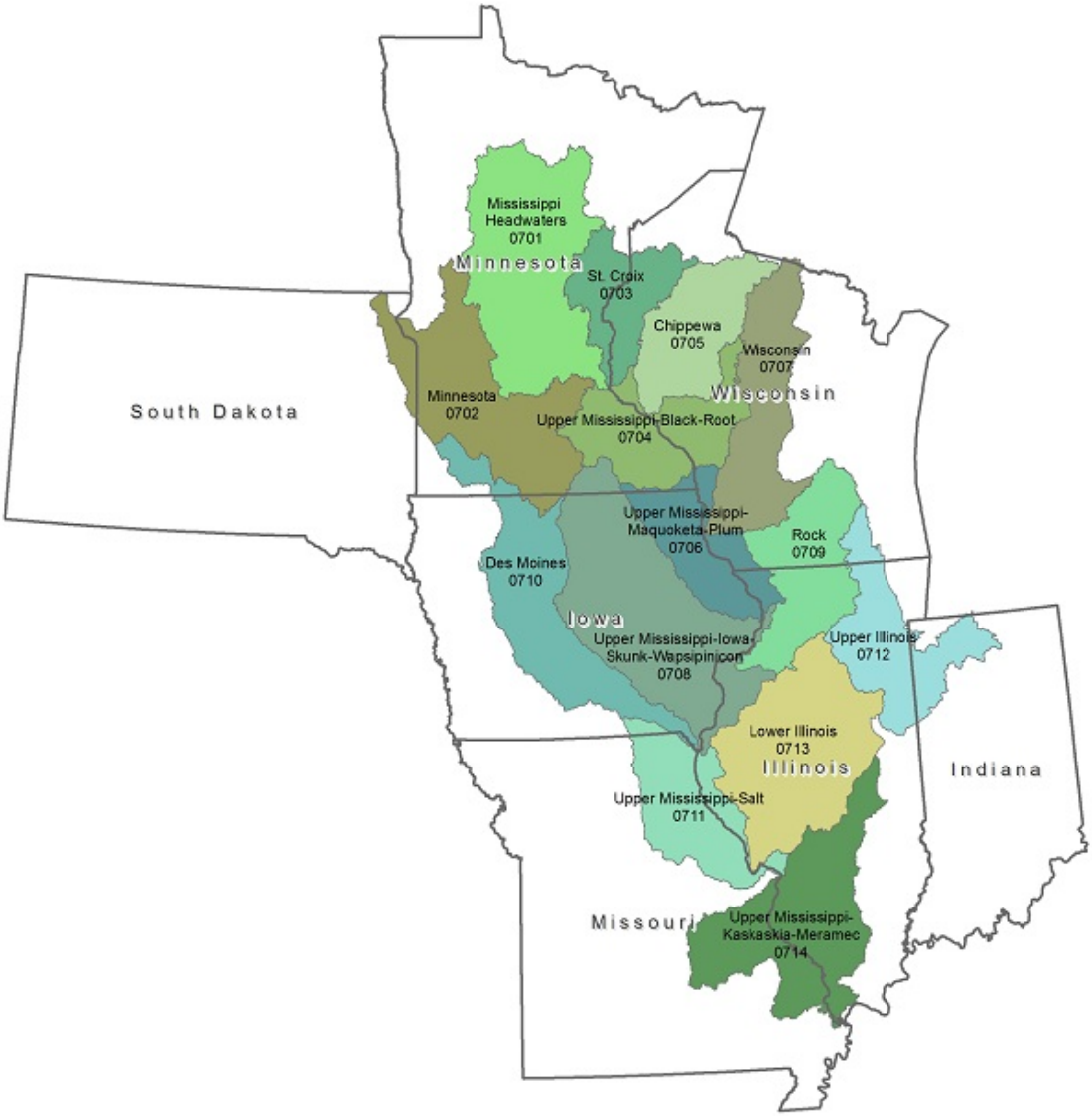
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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

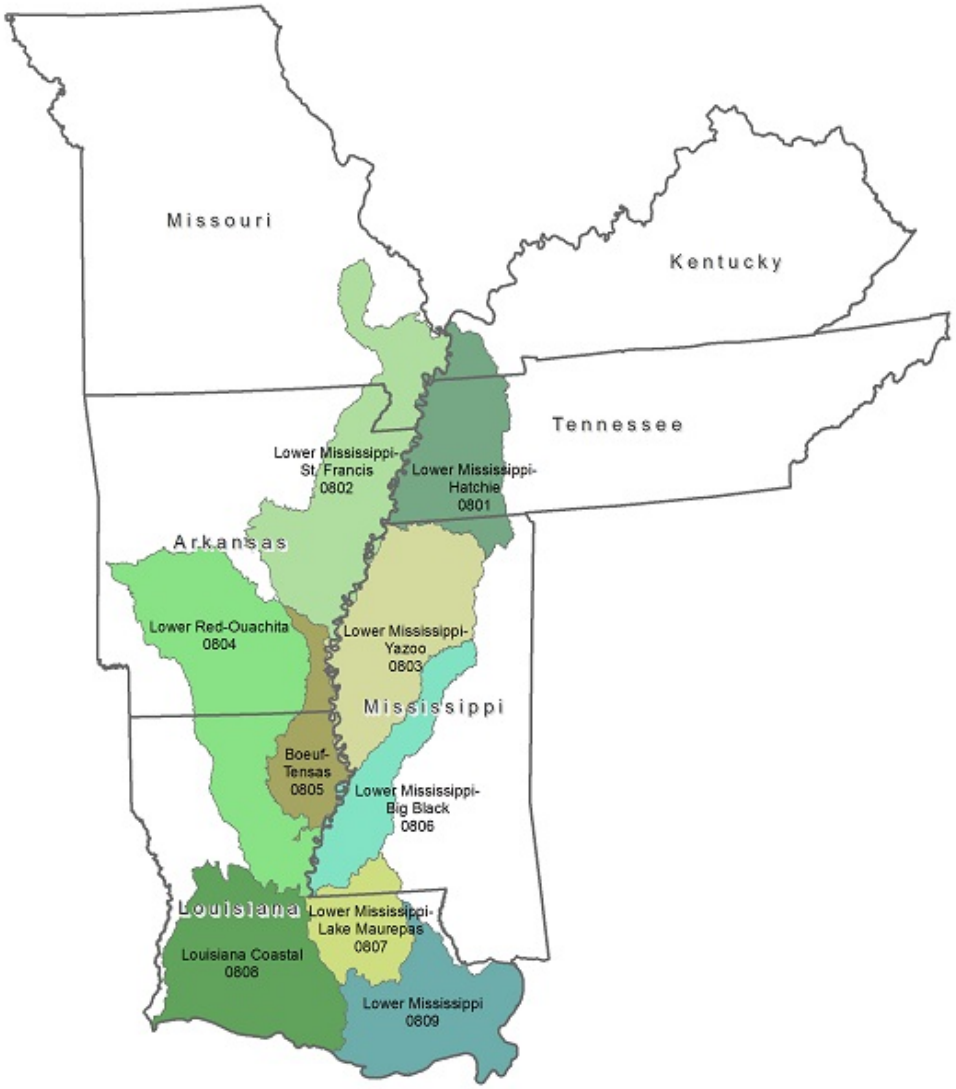
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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

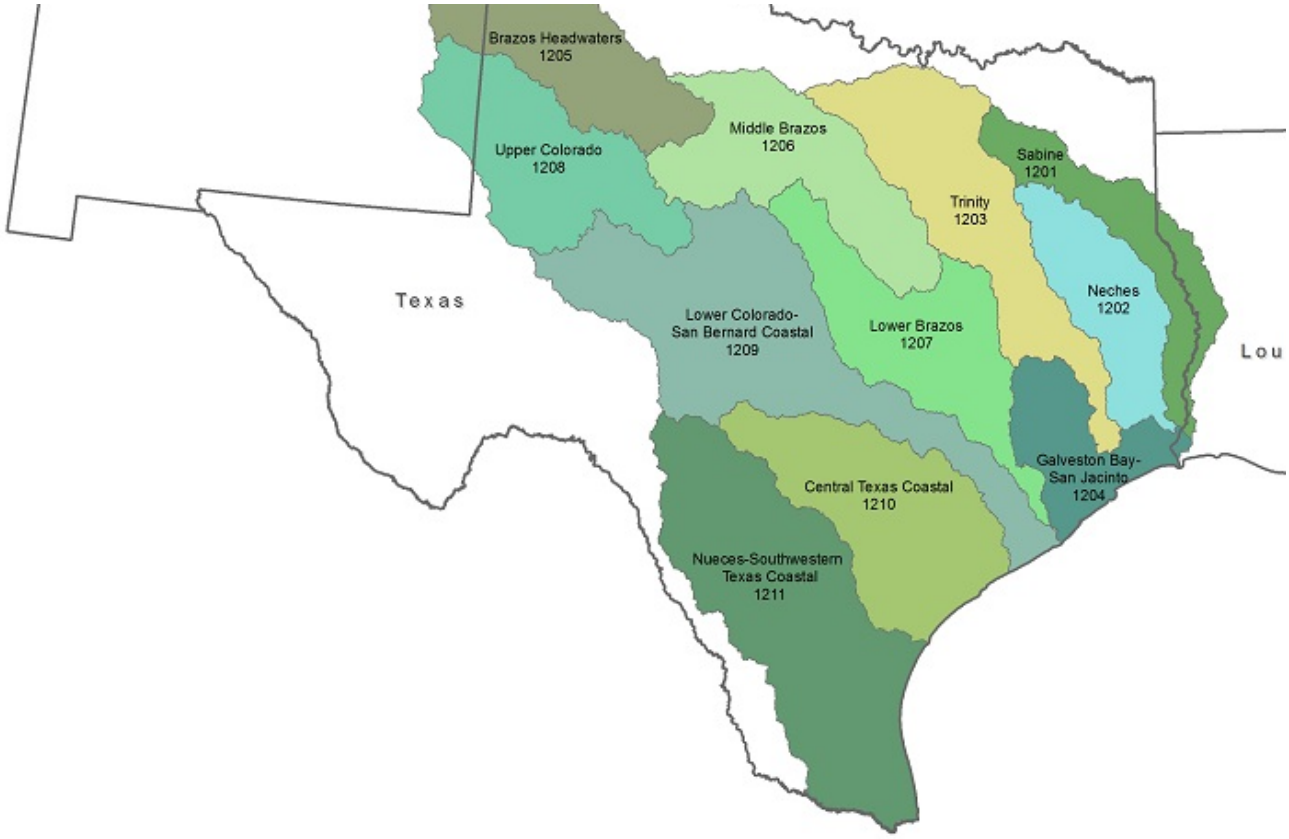
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 0801 - Lower Mississippi-Hatchie
- [ ] 0802 - Lower Mississippi-St. Francis
- [ ] 0803 - Lower Mississippi-Yazoo
- [ ] 0804 - Lower Red-Ouachita
- [ ] 0805 - Boeuf-Tensas
- [ ] 0806 - Lower Mississippi-Big Black
- [ ] 0807 - Lower Mississippi-Lake Maurepas
- [ ] 0808 - Louisiana Coastal
- [ ] 0809 - Lower Mississippi
- [ ] All codes

Question 49d7. 12 Texas – Gulf

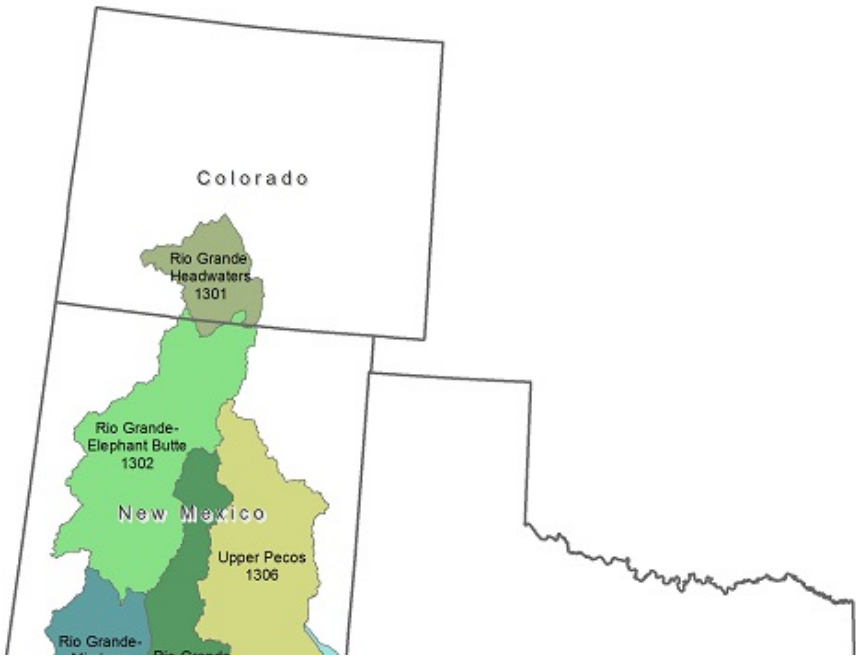
Please select individual HUC-4 codes for your specific hydrologic units.

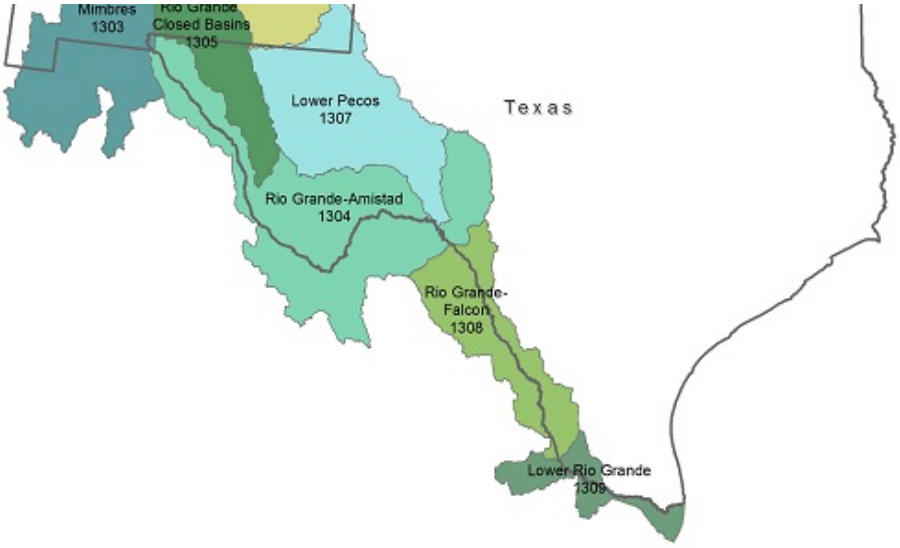


- [ ] 1201 - Sabine
- [ ] 1202 - Neches
- [ ] 1203 - Trinity
- [ ] 1204 - Galveston Bay-San Jacinto
- [ ] 1205 - Brazos Headwaters
- [ ] 1206 - Middle Brazos
- [ ] 1207 - Lower Brazos
- [ ] 1208 - Upper Colorado
- [ ] 1209 - Lower Colorado-San Bernard Coastal
- [ ] 1210 - Central Texas Coastal
- [ ]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

Question 49d8. 13 Rio Grande

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

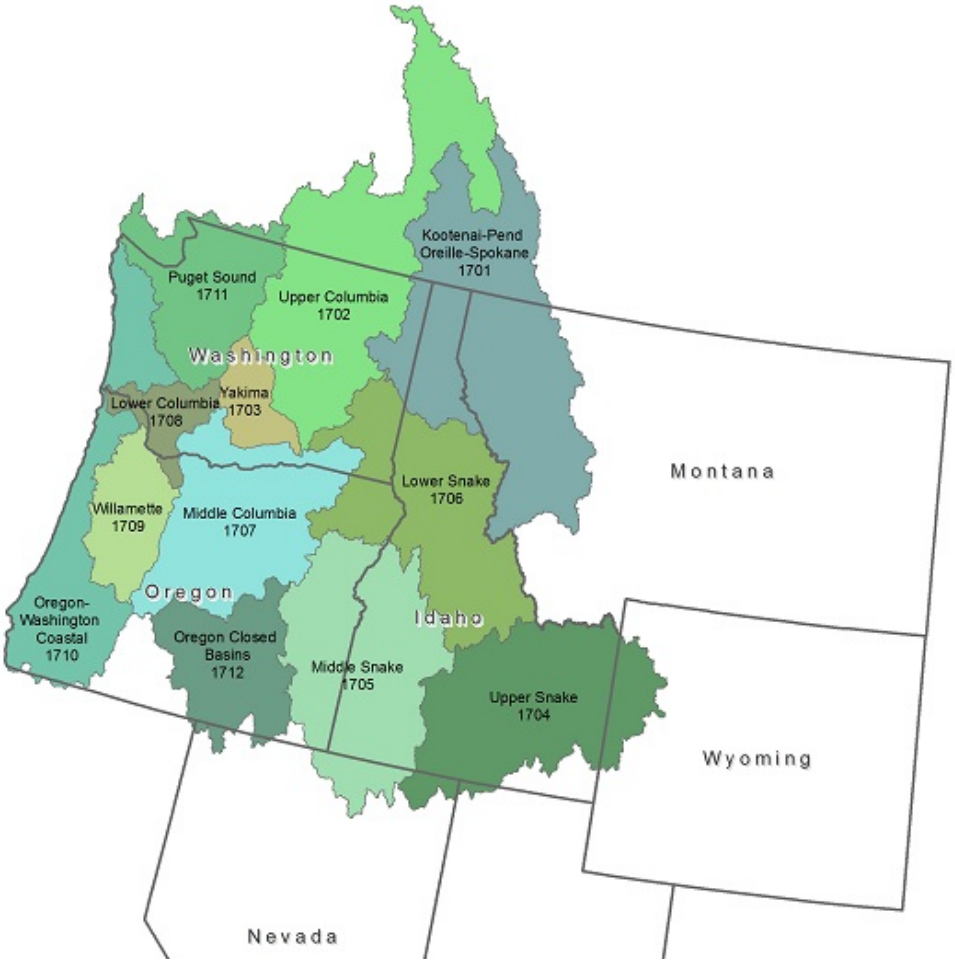


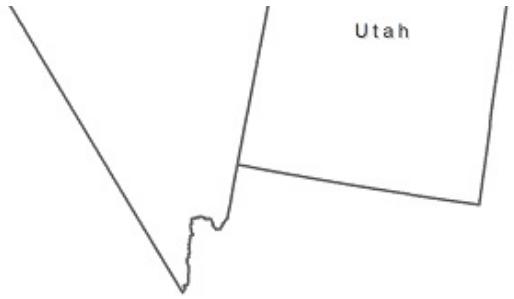


- [ ] 1301 - Rio Grande Headwaters
- [ ] 1302 - Rio Grande-Elephant Butte
- [ ] 1303 - Rio Grande-Mimbres
- [ ] 1304 - Rio Grande-Amistad
- [ ] 1305 - Rio Grande Closed Basins
- [ ] 1306 - Upper Pecos
- [ ] 1307 - Lower Pecos
- [ ] 1308 - Rio Grande-Falcon
- [ ] 1309 - Lower Rio Grande
- [ ] All codes

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

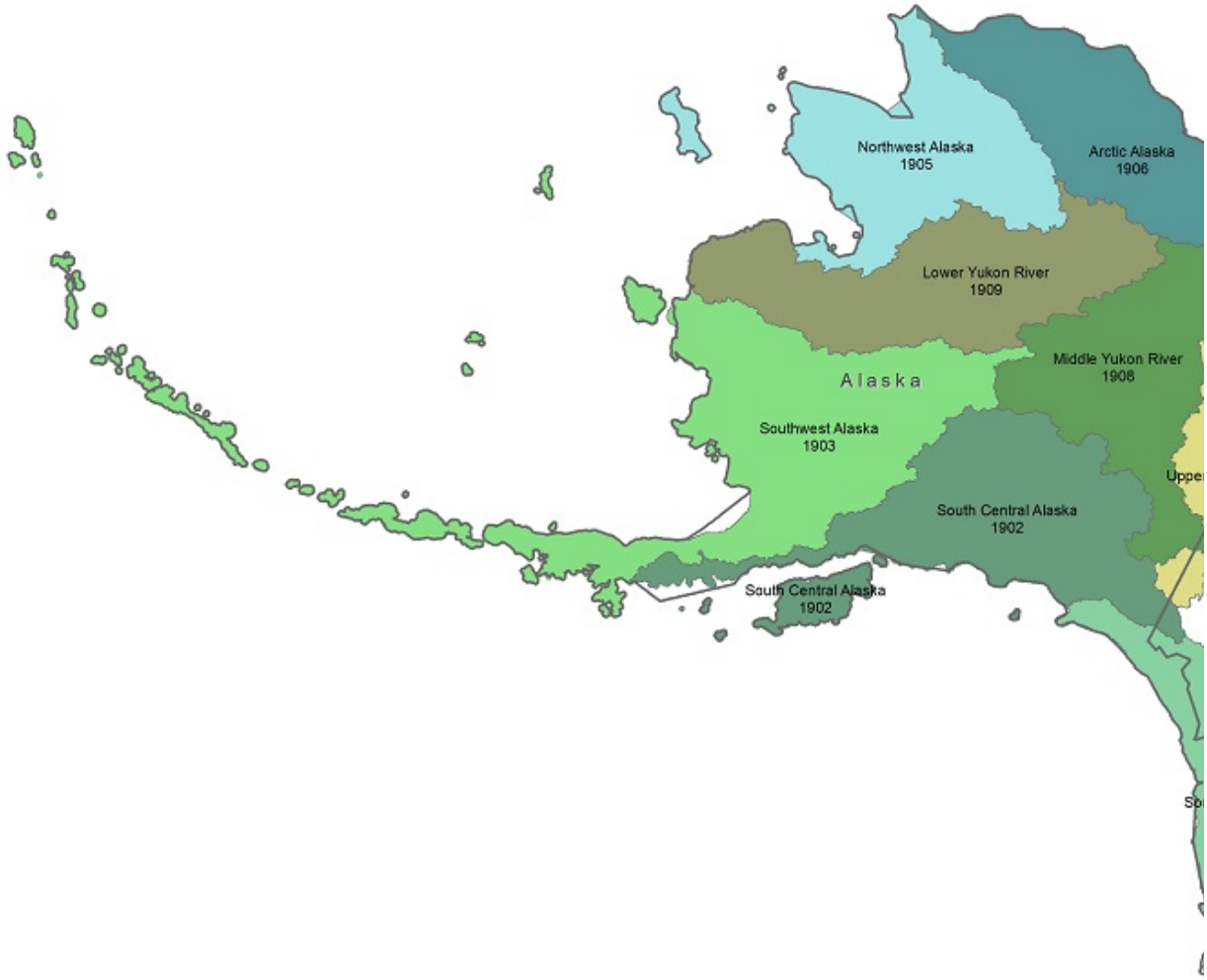
Question 49d10. 18 California

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

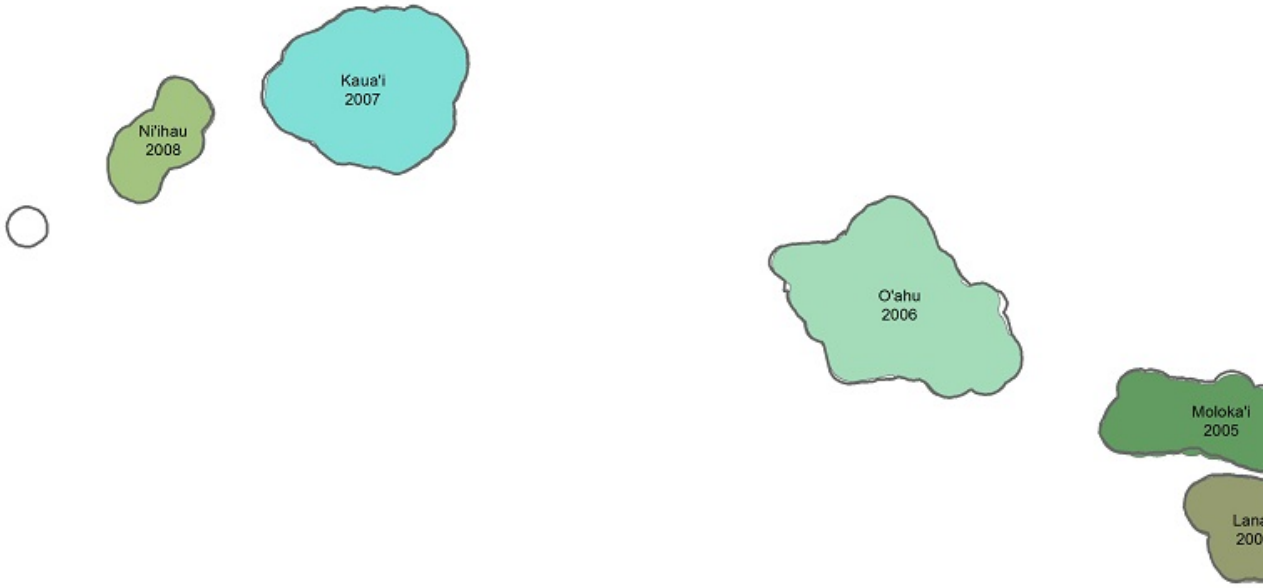
Please select individual HUC-4 codes for your specific hydrologic units.



- [ ] 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

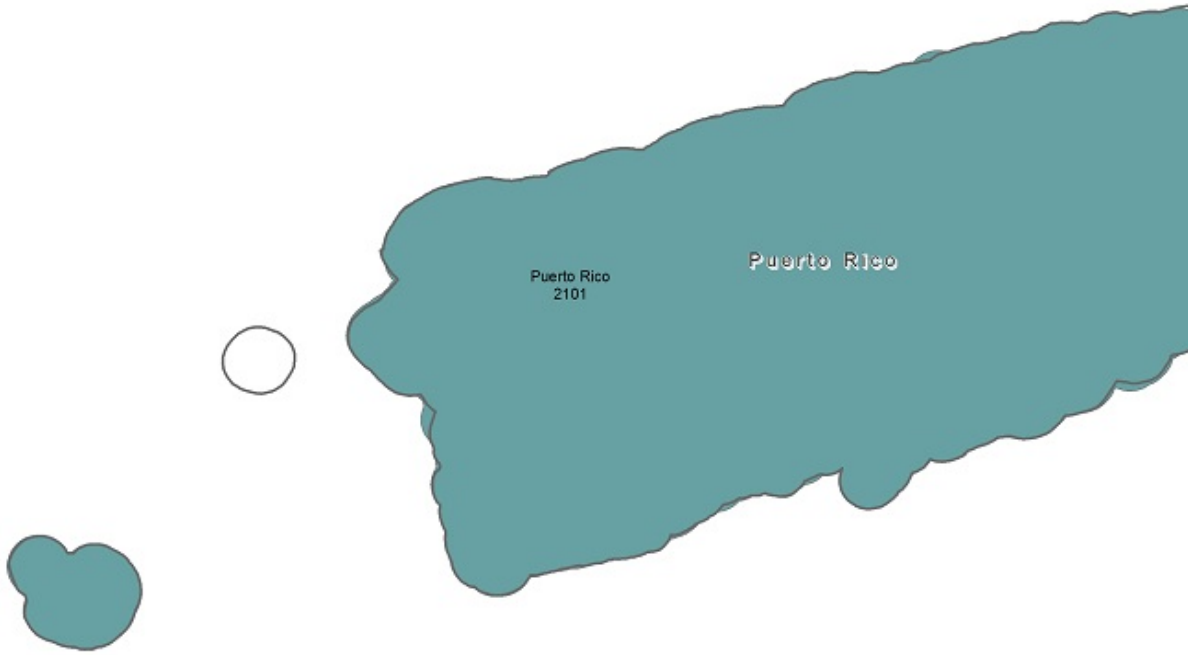
Please select individual HUC-4 codes for your specific hydrologic units.



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

Question 49d13. 21 Caribbean

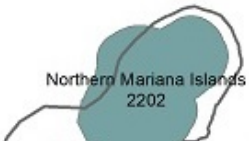
Please select individual HUC-4 codes for your specific hydrologic units.

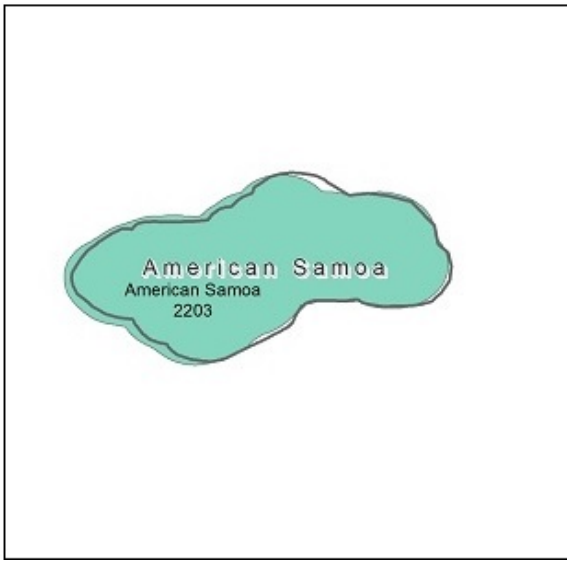


- [ ] 2101 - Puerto Rico
- [ ] 2102 - Virgin Islands
- [ ] All codes

Question 49d14. 22 Pacific Islands

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





- [ ] 2201 - Guam
- [ ] 2203 - American Samoa
- [ ] 2202 - Northern Mariana Islands
- [ ] 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
- [ ] All lands of U.S. Tribes
- [ ] 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
- [ ] Monitor
- [ ] Monterey Bay
- [ ] Olympic Coast
- [ ] Papahanaumokuakea

- [ ] Florida Keys
- [ ] Flower Garden Banks
- [ ] Gray's Reef
- [ ] Greater Farallones
- [ ] Hawaiian Islands Humpback Whale
- [ ] Marianas Trench
- [ ] 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

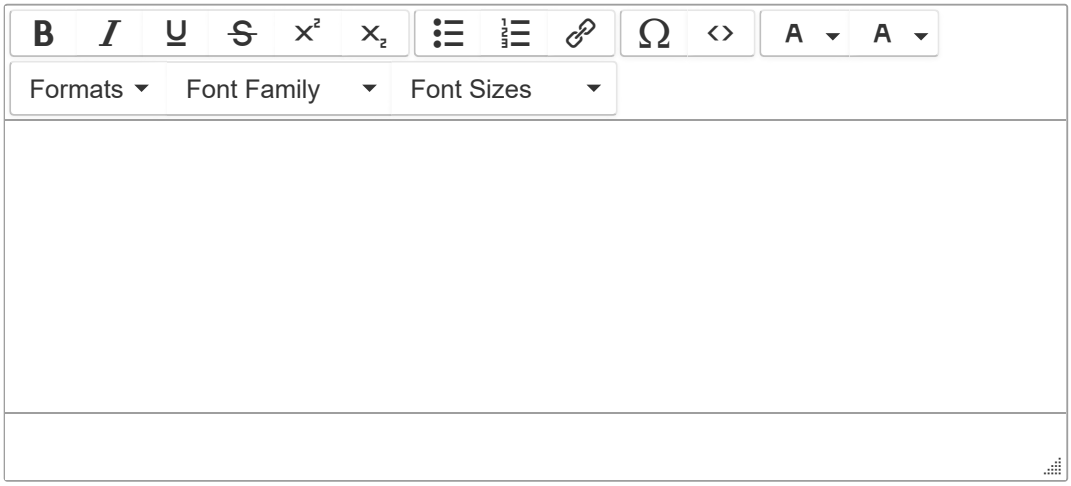
Question 51. What amount of vertical error is acceptable in your offshore bathymetric data? In other words, what is the needed Total Vertical Uncertainty (TVU) of your offshore 3D bathymetric data at the 95% confidence level? Check one. See FAQ #22 for background information.

- ○ 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

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 specify):

Question 54. For the offshore bathymetry portion of your Mission Critical Activity, do the IHO Order 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 specify):

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: 1) Required, 2) Highly desirable, 3) Nice to have, 4) 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 specify and rat	○	○	○	○
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 specify and rat	○	○	○	○

Question 56b. 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. See FAQ #19.

Importance rating: 1) Required, 2) Highly desirable, 3) Nice to have, 4) 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 specify and rat	○	○	○	○

Question 58. For the Mission Critical Activity that you specified, please describe the importance of integration of your offshore 3D bathymetric data with other datasets. For each data type, identify how important the data integration is. 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: 1) Required, 2) Highly desirable, 3) Nice to have, 4) 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	○	○	○	○

Land Use/ Land Cover				
Wetlands				
Estuaries				
Other (please specify and rat				

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 IHO Order and date, if known. Please enter text. See FAQ #18 for information about how to identify available data.

Formats Font Family Font Sizes

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 specify):

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 document.

	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)	○	○	○	○	○

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 document.

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	
	Major	Moderate	Minor	None	Don't know			
Future Operational Benefits from 3D offshore bathymetric data								
Time Savings								
Hours saved from faster and/or avoided field visits/inspections.	○	○	○	○	○	Select: ▼		
Hours saved through more efficient modeling, reviews, reporting, data dissemination, mapping, or other procedures	○	○	○	○	○	Select: ▼		
Data manipulation reduced/avoided (e.g., combining data from multiple	○	○	○	○	○	Select: ▼		

sources; changing projection, datum, etc.)								
Data errors reduced/avoided	○	○	○	○	○	Select: ▼		
Hours saved through in-office project planning or monitoring	○	○	○	○	○	Select: ▼		
Hours saved from more streamlined operations (e.g., permitting processes, offshore boundary determinations, etc.)	○	○	○	○	○	Select: ▼		
Other (please describe)	○	○	○	○	○	Select: ▼		

	Benefits your program is likely to receive					Dollars Saved	Amount of Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
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	○	○	○	○	○	Select: ▼		
Materials saved (e.g., fertilizer, pesticides, water, irrigation systems, pond design, beach/dune restoration, building/construction materials, etc.)	○	○	○	○	○	Select: ▼		
Other (please describe)	○	○	○	○	○	Select: ▼		

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

	Benefits your program is likely to receive	Dollars Realized/Earned	Amount of Dollars

	Benefits your program is likely to receive					Improvement	Percent Improvement	Dollars Realized/Earned
	Major	Moderate	Minor	None	Don't know			
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.)	○	○	○	○	○	Select: ▼		
Increased cargo carrying capacity	○	○	○	○	○	Select: ▼		
New products, services, or applications/apps sold	○	○	○	○	○	Select: ▼		
Other (please describe)	○	○	○	○	○	Select: ▼		

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

	Benefits your program is likely to receive					Hours/Dollars Saved	Amount of Hours/Dollars Saved
	Major	Moderate	Minor	None	Don't know		
Future Operational Benefits from 3D offshore bathymetric data							
Please describe	○	○	○	○	○	Select: ▼		

	Benefits your program is likely to receive					Hour/Dollar Benefits	Amount of Hours/Dollars Saved
	Major	Moderate	Minor	None	Don't know		
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.)	○	○	○	○	○	Select: ▼		
Improved accuracy of products or services (e.g. navigation charts, nautical charts, shoreline delineation, flood hazard maps, flood warnings, etc.)	○	○	○	○	○	Select: ▼		

Other (please describe)	○	○	○	○	○	Select: ▼		

	Benefits your program is likely to receive					Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
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.)	○	○	○	○	○	Select: ▼		
Faster response to an incident or event (e.g., faster access to impacted areas, faster response and recovery operations, improved evacuation plans, etc.)	○	○	○	○	○	Select: ▼		
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.)	○	○	○	○	○	Select: ▼		
Improved customer assistance (e.g., use of data allows virtual view and support via phone, email, chat)	○	○	○	○	○	Select: ▼		
More up to date services or products (e.g., nautical charts, navigation charts, flood hazard maps, etc.)	○	○	○	○	○	Select: ▼		
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.)	○	○	○	○	○	Select: ▼		
Other (please describe)	○	○	○	○	○	Select: ▼		

	Benefits your program is likely to receive					Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
Future Customer Service Benefits from 3D offshore bathymetric data								
Improved Customer Experience								
Increased customer confidence in products or services	○	○	○	○	○	Select: ▼		
New services, tools, or	○	○	○	○	○	Select: ▼		

applications/apps								
Better data availability (faster downloads, data are all in one place, etc.)	○	○	○	○	○	Select: ▼		
Other (please describe)	○	○	○	○	○	Select: ▼		

	Benefits your program is likely to receive					Hour/Dollar Benefits	Amount of Hours/Dollars Saved	
	Major	Moderate	Minor	None	Don't know			
Future Customer Service Benefits from 3D offshore bathymetric data								
Other (please describe in your own words)								
Please describe	○	○	○	○	○	Select: ▼		

	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: 1) Required, 2) Highly desirable, 3) Nice to have, 4) 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 specify and rat	○	○	○	○
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 specify and rat	○	○	○	○

Question 61b. 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 specify):

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 specify):	☐	☐	☐	☐

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	
Update frequency	
Vertical accuracy	

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 specify	○	○

Part 4: Information Access Methods/Final Comments

As information technology evolves, the Federal government has worked to keep pace with the most appropriate ways for provisioning 3D elevation data and related information.

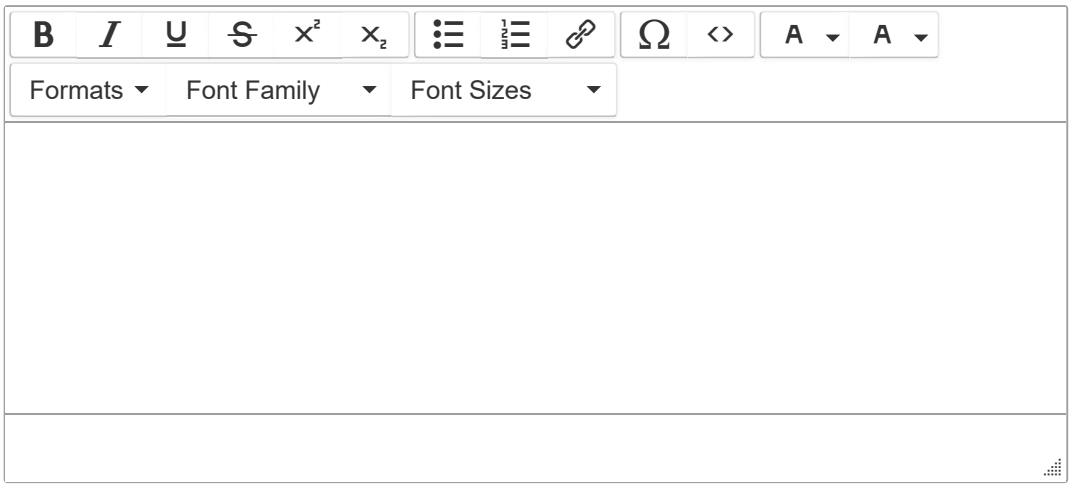
Question 66. For your Mission Critical Activity, please rate the importance of each data or web service access method using the following criteria: 1) Required, 2) Highly desirable, 3) Nice to have, or 4) Not required

Data or Service Access Method	Required	Highly desirable	Nice to have	Not required
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)	○	○	○	○

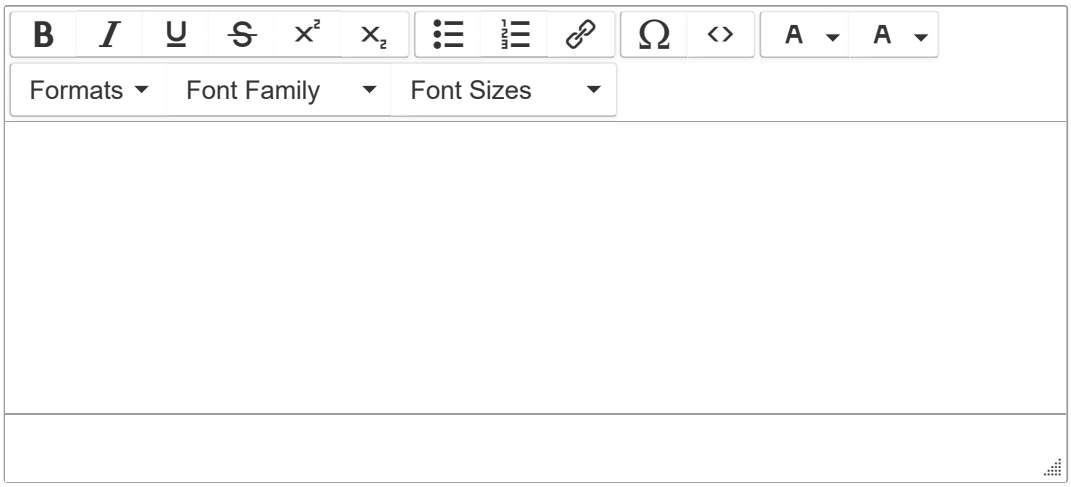
Question 67. Are there additional aspects of acquiring or using 3D elevation data for your Mission Critical Activity for which you could use assistance? Check all that apply.

- ☐ 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 specify):
- ☐ 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@noaa.gov or 3DNationStudy@usgs.gov.