



Navigation Safety and Natural Resource Interactions

TEC Significance

The Hudson River is nationally and regionally important as a commercial working river. It is a federally-designated Traditionally Navigable Water (TNW) and Waters of the United States (WOTUS), as well as a state-designated water under New York State Law. A federal navigation channel is authorized from New York City to Waterford, NY, which connects the ports in the Albany/Rensselaer area with other river ports and to the New York City/New Jersey Ports. These ports and their associated commercial shipping are a significant economic driver in the regional economy. In 2014, approximately 17.5 million tons of cargo were shipped on the Hudson River with 15.8 million tons bound for domestic ports, and 1.8 million tons shipped abroad. This river is important for both commercial navigation as well as for powerboat cruising, smaller recreational boating, and for human-powered watercraft.

The Hudson River estuary is also recognized nationally and regionally as an important recreational corridor and has received many State and Federal designations including: A) Hudson River Valley Greenway (State, 1991); B) Hudson River Valley National Heritage Area (Federal, 1996) (one of only 49 Areas in the country); C) American Heritage River (Federal, 1998) (one of only 14 rivers so designated in the country); D) Hudson River Greenway Water Trail (State, 2001); and E) National Water Trail (Federal, 2012). These designations support connectivity between the river and upland trails along the portions of the waterfront, which then connect into 3,000 miles of regional trails in the Hudson Valley, including the Appalachian Trail, which crosses over the river at the Bear Mountain Bridge. The Hudson River estuary is bookended by New York State's two most populous metropolitan areas, the greater New York City Region and the greater Albany Capital Region, and flows through 10 New York counties and past the waterfronts of 21 villages, 41 towns and 10 cities. Many municipalities are revitalizing their waterfronts by creatively readapting previous industrial infrastructure to support "blueway trails" (shorter paddling routes around local waterfronts), waterfront pedestrian trails, parks and other recreational amenities. Such actions weave connectivity into the Hudson River National Heritage Area's recreational, cultural and natural resources. Other important access and navigation features include commercial marinas, boat, yacht and rowing clubs, scenic boat cruises, fishing, swimming, hiking, and biking. This human interaction increases public awareness for the Hudson River estuary's important historic and natural resources and results in economic benefits from tourism through this corridor. The Hudson River Estuary Program identifies "education, river access, recreation and inspiration" as one of six key benefits people receive from the Hudson River.

The Navigation Safety and Natural Resource Interactions TEC facilitates human interface with the estuary, resulting in the political will and financial means to support and protect this important commercial and recreational resource. The Navigation Safety and Natural Resource Interactions TEC strongly links with the Estuary Education TEC, providing locations where the public can learn about the estuary. Many infrastructure activities associated with the Navigation Safety and Natural Resource Interactions TEC creates synergy with the Resilient Waterfronts and Community Shorelines TEC. Dredging is very costly and often constrains the Navigation Safety and Natural Resource Interactions TEC due to issues discussed in the Contaminants TEC and Sediments TEC. Finally, the Navigation Safety and

Natural Resource Interactions TEC may have negative impacts on the “biological” TECs (Shallow Water and Intertidal TEC, Hudson River Shorelines and Riparian Areas TEC, and Resilient Plant and Animal Communities TEC). Keys to reducing negative impacts on these important resources include facilitating public access to current data, sound planning, strong regulation and proactive and effective safety and emergency response plans.

Goal

In 2070, infrastructure for and activities associated with commercial navigation and recreational access will be developed and undertaken in a safe and efficient manner for all users while minimizing impacts to ecological, scenic and historic resources and while planning for sea level rise.

TEC Context

Historical Context

The Hudson Valley’s First People, the Iroquois, Mohican and Lenape, accessed and navigated along the Hudson. The river was ultimately named for Dutch explorer Henry Hudson who sailed north to what is now Albany in 1609, followed by Europeans who settled along the river in the 1600s-1700s. During the Industrial Revolution, development was focused on the river’s waterfront, and with the construction of the State Dam and Sloop Lock in Troy by 1823 and the Erie Canal by 1825, New York City’s ports were connected to frontier cities, with much of the nation’s goods transported through this corridor. Navigational capacity, however, was limited due to shallow waters and shoaling in the Hudson River between Troy and Catskill. State and Federal governments sought to increase channel depth. This ultimately led to the adoption of the existing federal navigation project (Hudson River, NY; New York City to Waterford) by Congress in 1910-1930, modified in 1934, 1935, 1938 and 1954. The 1954 modification authorized the federal navigation channel’s current depth of 32 feet (in soft material) and 34 feet (in rock). The disposal of dredged material to create the navigation channel resulted in the loss of approximately 4,100 acres of shallow and intertidal wetland habitats between Catskill and Troy. Railroads constructed on both banks of the Hudson River (1800s) increased the transportation capacity though the Valley but cut off access to approximately 70% of the Hudson River shoreline. The Hudson River served as one backdrop in the continuing national dialog about balancing development and the natural environment, starting with themes explored by the Hudson River School and others, and continuing through the 1960s with Storm King Mountain and the subsequent 1969 passage of the National Environmental Policy Act. In the 1990s, New York’s recognition of the Hudson River Valley Greenway promoted communities’ coordination to advance goals of natural and cultural resource protection, regional planning and economic development, public access and heritage and environmental education, and the Hudson Valley and its river continues as a nationally important corridor of technology, manufacturing, commerce, and natural resources.

Current State

Commercial Navigation and Ports

The U.S. Army Corps of Engineers Albany field office maintains the Hudson River 32-foot federal navigation channel from Waterford to Kingston, with a goal of scheduling projects on two-year cycles including regular completion of condition surveys, maintenance dredging, and removal of snags. The Albany field office, in coordination with the Hudson River Pilot’s Association, undertakes its own bathymetric surveys, identifies priority dredging locations, and develops maintenance dredging plans, with dredged materials placed at the federal disposal site on Houghtaling Island in New Baltimore. All federal dredging projects are subject to approval of funds by Congress, and the cost of each project is highly variable. Factors include economics, project size and sediment quality, which can be a significant

cost influence, depending upon the extent of sediment sampling and characterization requirements, the need for regulatory and environmental coordination, mandated controls/restrictions placed on dredging equipment and operations, and costs to monitor effluent discharges from dredged disposal to receiving waters. Increasing the navigation channel's federally mandated project depth is not currently being considered. South of Kingston, the river is naturally deep (greater than the 32-foot project depth) to Haverstraw Bay, where shoaling is a concern. The U.S. Army Corps of Engineers New York District Operations Division is responsible for this river section to New York City.

Currently available mapping indicates approximately 39 port facilities and/or docks/wharves in the Albany/Rensselaer County region, 14 port facilities/docks in the Ulster/Greene County region, and 40 facilities in the Dutchess/Rockland/Orange/Putnam/Westchester region, although not all these facilities may be operational. Materials regularly shipped on the river from these port facilities include crude materials, primarily gravel, sand along with iron ore and scrap metal, as well as chemicals, manufactured goods including cement, food products, sewage sludge and wastewater. As discussed below, petroleum fuel products are also shipped on the river. Oversized and large heavy lift cargo, that cannot be shipped by road, such as construction equipment, turbines, generators, steel, and materials used in the Tappan Zee bridge reconstruction, are regularly transported on the Hudson. According to the U.S. Army, the Federal Lock and Dam at Troy, NY ensures safe navigation of \$6 billion worth of commerce annually.

Recreational Access by Water and Land

The 256-mile long Hudson River Greenway Water Trail links the upper Hudson River to Manhattan. Under the Water Trail banner, the Hudson River Greenway and the Hudson River Water Trail Association coordinate facilities to support paddlers and provide access to the River via state, local and private lands. Access is provided every 10 miles on each side of the river and overnight camping accommodations every 15 miles, along with watercraft storage and bathrooms at points of interest along the trail, as published in a regularly-updated guidebook/map set, and website mapping.

The Hudson River estuary also supports approximately 60 yacht/boat clubs and marinas (approximately 30 each). The yacht/boat clubs are boating and social clubs, often private, but sometimes located on municipal lands where they can assist the municipality in collecting launch fees and monitor activities for the municipality. Members are often part of the U.S. Coast Guard Auxiliary and can complete boat inspections for compliance with safety and environmental regulations, and good seamanship and boating knowledge is also exchanged among members. Marinas provide boating supplies, repair services, fuel and pump outs, along with boat docking and winter storage stored over the winter. As of 2008, the NYSDEC identified approximately 40 pump-out facilities in the Hudson River estuary.

The federally-designated four-million-acre Hudson River Valley National Heritage Area and its partners provide technical and financial support including a website and published guidebook describing specific attractions from Waterford, NY to New York City. There are also numerous state parks, several state wildlife management areas and forests, and county, local and not-for-profit parks, including 42 Scenic Hudson sites from which to access the Hudson River estuary. There are also four official public beaches in the Hudson River estuary, along with hundreds of unofficial swimming spots, and 5 to 12 open-water swim events annually. Ongoing water quality issues are a concern for fishing and swimming, and the number of beaches is naturally limited.

Many municipalities are undertaking waterfront revitalization, upgrading and modifying existing piers and structures for commercial and tourism use. Tourist river cruises are a significant economic benefit to municipalities in the southern section of the Hudson River estuary. The Hudson Valley Greenway is also

working with communities and not-for-profits to establish a system of trails that link these cultural and historic sites and parks to public access points along the Hudson River. For example, the success of the 1.28-mile Walkway over the Hudson State Park, which converted an abandoned railroad bridge from Poughkeepsie to Highland into the world's longest/tallest linear pedestrian and bicycle walkway, demonstrates the desire of the public to meet the Hudson River on foot or by bike, and the linkages that are occurring from the river's waterfront to designations beyond the study area. A review of mapping indicates that the most municipalities have at least one public access point on the Hudson River.

Mapping

The following links to a map of existing Water Access and Navigation Resources along the Hudson River. <http://upstategis.maps.arcgis.com/apps/View/index.html?appid=6ddfc5da8d184a6083486c8cef84ab58>

Trends and Drivers

Both commercial navigation and tourism/recreational activities on the river are on the rise. This results in the likelihood of perceived or actual conflicts between commercial and recreational boating on the Hudson. It also leads to the likelihood of perceived or actual conflict between Water Access and Navigation (for both commercial and recreational activities) and ecological resources (i.e., Tidal/Intertidal wetlands, SAV/Shallow Water, Riparian Buffers/Floodplains and Natural Communities).

Commercial Navigation and Ports

The Port of Albany is focused on improving infrastructure and equipment to maintain a competitive edge for shipping materials associated with on-going improvements in technology and manufacturing. For example, new General Electric steam turbines and generators are larger than ever for efficiency gains and are now being shipped assembled. The Port of Albany is making investments in heavy lift and supersized cargo handling capacities, including roll-on/roll off devices to increase the marketability of the facility by expanding the types and sizes of the cargo that it can accommodate, including the ability to load larger pieces of fully assembled equipment on to vessels. The Port of Albany and the Port of Coeymans are also looking to expand their footprints.

Since the 2010s, there has been a significant increase in the volume of Bakken crude oil transported through Hudson River estuary by rail and water (approximately 20% of all Bakken oil is shipped through this corridor). In 2014, New York studied the environmental threats from this activity and identified 27 action items. By late 2016, the United States Coast Guard (USCG) updated the NY/NJ Area Contingency Plan (ACP). Specific recommendations included adding the upper Hudson River to the ACP, increasing preparedness for a rail or shipping accidents and pre-positioning response equipment (hard boom/sorbent materials) in locations to better protect environmentally sensitive areas.

Increased shipping traffic especially related to oil transport has refocused the need for safe shipping conditions. The Hudson River Pilots Association is concerned about on-going shoaling and maintenance needs of the federal navigation channel, narrow bridge clearances in the Kingston to Waterford portion of the Hudson, especially at Castleton, the use of multiple elevation datum within the Hudson River estuary, the lack of continuous on-line real-time tidal elevation datum or weather condition reporting.

The U.S. Army Corps of Engineers has indicated that there is adequate capacity for the foreseeable future for dredge disposal volumes on Houghtaling Island in New Baltimore. The U.S. Army Corps of Engineers is researching the possibility of contracting with interested parties for beneficial reuse of this mostly sandy material. Beneficial reuse would restore capacity at the dredge disposal site. This proposed action does not provide capacity to the U.S. Army Corps of Engineers for any dredging beyond

maintenance activities, nor does it address dredging areas of the river (i.e., access channels) by non-federal entities, which are not allowed to use the federal dredge disposal site.

Recreational Access by Water and Land

The Hudson River Greenway Water Trail system is nearly complete but continue to seek possible replacement locations throughout the system in case some sites must be taken out of use. Given the relatively low entry cost for paddle sports, more people, many inexperienced, are paddling on the Hudson River, raising safety concerns given the River's tidal nature, changing weather, water temperatures and conflicts with commercial vessels. The Water Trail Guidebook and Maps discuss safety, but safety remains a concern for paddlers. Many municipalities are upgrading and modifying existing piers and structures for recreational uses including river cruises. In many locations, waterfront adaptation has been so successful that additional area or infrastructure is needed. Waterfront trail and pedestrian corridor development is on-going with a desire to create a connected corridor from north to south along and close to the Hudson River, given existing infrastructure and ecological constraints. Connection to the greater Greenway Trail system from waterfronts is also sought.

Sea level rise may result in additional stress on existing river access points and their infrastructure; new access infrastructure advanced with government funding is required to plan for sea level rise.

Constraints

Dredging is a significant constraint for existing marinas, yacht/boat clubs, municipal piers and other potential waterfront locations where, for example, tall ship or schooner access is sought. Often the facility itself has adequate depth but access to deep water is hindered by shoaling. Low levels of PCBs and heavy metals are frequently found in sediments near these facilities. While removing these sediments from the Hudson River estuary provides a long-term water quality benefit, planning and handling costs are prohibitive. The NYSDEC Region 2 Dredge Team is working to develop a bundled dredging program so facilities can work together to develop a dredge materials management plan. They are also looking to revise screening assessment sampling protocols to reduce initial testing requirements (number of samples and contaminant screened) and find additional upland disposal sites. Even with these efforts, dredging continues to be cost prohibitive for most non-federal entities.

Permitting of facilities within the Hudson River estuary can require consultation or reviews by up to 10 federal, state and local entities under 15 different environmental regulations, resulting in significant expenditures of time, effort and cost while delaying improved access to the river.

Despite many organizations developing guidebooks, paper and web-based maps for resources in the Hudson Valley, there is no "one-stop consolidated resource" for these access and navigation resources along the Hudson River. And despite the many facilities discussed above, access to the Hudson River can still be difficult for some people and for at various locations. Providing accessible sites for individuals with disabilities as well as active yet aging baby-boomers is an area of concern. Many facilities are not fully ADA-compliant, and a complete inventory of these facilities has not been completed. Outside of established locations, access across railroads is limited to existing at-grade or overpass rail crossings, and sea level rise may impact those access points. Crossing railroad tracks in locations without an established crossing is illegal and dangerous. Private ownership, steep shorelines and shallow inlets also continue to impede access.

Action Table

Objectives	Quantifiable Actions (see Action Narrative below)	Timeframe
Objective 1: Improve commercial navigation safety to address and reduce risk and conflict	1A. A Navigation Working Group for the Hudson River established to regularly discuss river use for ports, commercial and recreational navigation and to informally identify and address use conflicts and safety concerns	2020
	1B. Implement the action items in the 2016 ACP	2020
	1C. Safety improvements in place for commercial navigation including those identified in the Action Narrative, and additional items identified through the Navigation Working Group	2020-2070
Objective 2: Upgrade Port Technology and Capacity	2A. Port infrastructure upgraded to meet evolving product demand and increase use for warehouse/distribution from port including supply chain management upgrades, new warehousing, roll-on roll-off devices, and possibly heavy lift and supersized cargo handling	2030
Objective 3: Maintain and Improve Water Trail	3A. The Hudson River Greenway Water Trail has kayak/canoe launch every 10 miles on both sides of the river and campsite every 15 miles through the Hudson River estuary and has identified replacement sites to maintain this goal	2020
Objective 4: Inventory, maintain and improve recreational access to river. (These actions may be mirrored in the Resilient Waterfronts and Community Shorelines TEC.)	4A. Inventory and assessment of existing recreational access facilities completed to identify coverage gaps, facility gaps, modifications needed for sea level rise and ADA compliance	2020
	4B. Inventory prioritized, and actions items list developed for use in funding and grant opportunities and for implementation	2030
	4C. Recreational access points ADA compliant and resilient to sea level rise	2070
	4D. One-stop comprehensive internet database and map for recreational access points developed and maintained	2030
Objective 5: Improve access by improving feasibility of dredging for non-federal entities	5A. Establish a dredging cooperative for marinas, boat clubs and municipalities to take advantage of grant and funding opportunities for dredging in return for retrofitting existing facilities to mitigate against flooding, sea level rise, impacts to human health and ecological resources	2030
	5B. Report completed discussing dredging needs/volumes for areas outside of navigation channel and locations for disposal in environmentally sound manner. Report based on new NOAA Hudson River sounding data and existing infrastructure locations	2030
Objective 6: Infrastructure improvements will avoid impacts on ecological, scenic or cultural resources	6A. Develop a working group to facilitate permitting guidance	2020
	6B. Waterfront Permitting Guide available on-line for Hudson River estuary	2030

	6C. Comprehensive database of pre-identified environmentally sensitive resources (and locations for future migrations of wetlands/resources) readily available to public	2020
Objective 7: Maintain or improve boater safety awareness including non-motorized and small motorized boats	7A. Strong safety campaign implemented to increase safety awareness for canoers, kayakers and small motorized boaters on the Hudson River	2030

Action Narrative

Objective 1: Improve commercial navigational safety to address and reduce risk and conflicts.

- By 2020: Objective 1A. The purpose of this group will be to regularly discuss issues of port development, commercial navigation and recreational navigation to informally identify and address conflicts and safety concerns. For example, such a group might have been helpful in proactively addressing the number and locations of proposed anchorages. The group might consider including representatives of the U.S. Coast Guard, U. S. Army Corps of Engineers, Hudson River Pilot’s Association, Hudson River Estuary Ports, Hudson River Boat and Yacht Club Association, Marina Associations, Hudson River Water Trail, Riverkeeper, and other environmental groups. See also Hudson River Estuary Program Action Agenda goal “facilitate communication and coordination between working waterfront stakeholders and riverfront communities so that community planners and waterfront designers have information about the needs of working boats and their benefits to the community and region.”
- By 2020: Objective 1B. Specific recommendations within the ACP should be implemented, including increasing preparedness for a rail or tanker/barge accident with Bakken or sinking oils, pre-positioning response equipment (hard boom/sorbent materials) in key locations in the Hudson River estuary to protect environmentally sensitive areas and completing annual spill exercises simulating both boat and rail accidents.
- From 2020-2070: Objective 1C. Safety Improvements. Specific safety improvements were identified:
 - By 2020. A “weather bug” camera network established in multiple locations within the Hudson River estuary for remote observation of weather conditions via the internet.
 - By 2020. Cellular coverage/VHB Base Stations with radio antenna with internet connection located every 10 to 12 miles to provide better coverage for auto identification for commercial and motorized recreational boaters.
 - By 2020. Protocol using navigable miles and statute miles established on the river.
 - By 2030. Consistent datum established for the river so that tidal elevations are reported consistently across all platforms. Examine completing this in collaboration with HRECOS (see Hudson River Estuary Program Action Agenda goals for HRECOS). Standardized datum is clearly cross-referenced to other common datum.
 - By 2030. Real-time tidal gauging station using consistent datum, accessible by internet and telephone provided for the Castleton Bridge with its restricted elevation clearance.
 - By 2030. Real time tidal gauging stations using consistent datum, accessible by internet and telephone established at all bridges along the Hudson River.
 - By 2030. A study of commercial navigation relative to bridge height/ship elevations completed to identify current or future critical infrastructure conflicts and solutions.
 - By 2070. solutions identified in bridge height study are implemented.

Objective 2: Upgrade port technology and capacity. Scenic Hudson notes that they do not support this action as currently written and have commented that it is not clear which ports are being proposed in the action. They note that there are proposed “port infrastructure upgrades” at Albany to facilitate the transportation of heavy tar sands crude oil, which would represent a new and serious threat to the Hudson River. They note that there was also a proposal to expand the port in New Windsor to handle heavy crude, which could be proposed again in the future. They note that there has been local controversy regarding the Greene County port as the landowner wants to expand the port’s footprint, Scenic Hudson could support such an expansion if it excluded upgrades to handle petroleum or hazardous materials. The purpose of Objective 1A is to develop a working group that can discuss and vet these issues prior to proposal and permitting.

Objective 3: Maintain and improve Water Trail.

- By 2020: The Hudson River Greenway Trail is close to meeting its goal of having canoe launches every 10 miles on both sides of the river and campsite every 15 miles. By 2020, the Hudson River Greenway Trail will infill with one launch site in the Albany-Kingston area and two camping sites (one in Albany and one in Cold Springs/Peekskill). The Trail continues to identify additional access points to replace locations which may withdraw from the program. The Trail may also seek to include additional amenities (restrooms, boat storage, etc.) at sites.

Objective 4: Inventory, maintain, and improve recreational access to the river.

- By 2020: Objective 1A. The inventory of all existing recreational access facilities to the river completed for coverage gaps, facility gaps, modifications needed for sea level rise and for ADA compliance. Items to be inventoried include Hudson River Valley Greenway Water Trail access points, marinas, pump outs, boat/yacht clubs, other cartop and trailered launches (it was noted that there may be a limiting number of trailer boat launches for smaller fishing boats, especially in the mid-Hudson area), official and unofficial swimming beaches and spots, access points for fishing and crabbing, railroad crossing locations, municipal piers and waterfront amenities, municipal blueway trails, and trails accessing the water. Public versus private sites would be noted during the inventory. This is also an opportunity to review the “Hudson We Share” project opportunities list (see the [Hudson River Mapper](#)), prioritizing for selection and funding those projects that bring the greatest public use to the river, do not overlap with existing recreational infrastructure, are not located in sensitive environmental areas, are ADA accessible and are resilient to sea level. The Hudson River Estuary Program access coordinator is seeking to ensure that new and existing river access facilities are accessible. An inventory of all facilities would be that agency’s first step.
- By 2030. Objective 4B. No additional details needed.
- By 2070. Objective 4C. No additional details needed.
- By 2030. Objective 4D. One-stop comprehensive internet database and map for recreational access points developed and maintained. Currently there is not a single database for all recreational access points to the river; lists are maintained by a variety of organizations and some appear to be dated or incorrect.

It is noted that the Hudson River Estuary Program Action Agenda has numerous goals associated with locating educational facilities/placards/programs at waterfront facilities. Completing an inventory of all access points would benefit the process of identifying good locations for educational access and would interface well with the Estuary Program and the Estuary Education TEC goals. The Estuary Program Action Agenda also has numerous goals for improved access for fishing, swimming, boating and wildlife-dependent recreation, using universal design and storm resilience, especially in underserved

communities. The action agenda seeks to “revitalize all the waterfronts in the valley so that the Hudson is once again the ‘front door’ for river communities, with protected scenic vistas, working ports and harbors, lively town centers offering economic and cultural opportunities and public river access.” These goals align well with this objective.

Objective 5: By 2030. Improve access between the navigation channel and existing marina, boat/yacht club and municipal dock and nearshore facilities through dredging of shallow areas undertaken by non-federal entities. See also Hudson River Estuary Program Action Agenda goals including: “coordinate with U.S. Army Corps of Engineers on future maintenance dredging of the river that supports maritime activity in river communities;” and “river maintenance dredging and dredged material management needs are managed to sustain ecosystems and help boat launches, yacht clubs, marinas and ports remain viable sites for enjoyment of the river and maritime trade.” Many of the actions in the Estuary Program Action Agenda align well with the goals in this TEC, described below.

- By 2030. Objective 5A. Dredging cooperative established for marinas, clubs and municipalities (including in waterfront areas to support, for example, tall ships) to take advantage of grant and funding opportunities for dredging in return for retrofitting existing facilities to mitigate against flooding, sea level rise, impacts to human health and ecological resources. NYSDEC is currently developing streamlined/facilitated bundled dredging program for marinas and boat/yacht clubs, including a written description of the program and how to apply. NYSDEC or others to identify funding/grant opportunities for dredging programs. An additional program could provide an incentive approach to these entities to inventory their existing facilities for flooding, sea level rise resiliency, and access (i.e., utilities retrofitted above flood elevation or floodproofed, fuel storage facilities secured, access) in return for funds to address dredging or other issues.
- By 2030: Report completed discussing dredging needs/volumes for areas outside of the federal navigation channel and locations for disposal in environmentally sound manner. Report based on new NOAA Hudson River sounding data and existing infrastructure locations. This will assist these entities to advance identify dredging of silted in channels and locations for disposal.

Objective 6: Infrastructure improvements will avoid impacts on ecological, scenic or cultural resources.

- By 2020. Objective 6A. Develop a working group of permitting staff (by NYSDEC Region) that would meet regularly to discuss regulatory/permitting issues and could also be available to meet with prospective permittees about projects on the Hudson River as part of feasibility assessments.
- By 2030. Objective 6B. Waterfront Permitting Guide available on-line for Hudson River estuary. The on-line guide would be developed to discuss permitting processes through federal, state and local entities, and discuss accessibility, potential grant opportunities and sea level rise requirements. There is a [NYC waterfront permitting guide](#) that could be a model.
- By 2020. Objective 6C. One-stop comprehensive electronic database of pre-identified environmentally sensitive resources (and future migrations of wetlands/resources) readily available to public, understanding that some sensitive ecological information is available by request only. There is not a single comprehensive database location available to the public to identify locations of environmentally sensitive resources. Databases also do not identify areas planned for reestablishment of ecological resources (i.e., intertidal wetlands or SAV). Providing this mapping will facilitate avoidance of these resources during planning of retrofits or new infrastructure. Similar goals are also noted in the Hudson River Estuary Program Action Agenda, such as “assist Hudson River shoreline communities with identifying and capitalizing on important natural resources and helping people use and enjoy them;” “communities along the Hudson and in the watershed use natural resource information to create land-use practices,

plans and policies that conserve priority lands and waters to benefit people and estuary;” and “[provide] access to current science-based information about priority lands and waters, conservation principals, and land-use planning tools and techniques for natural resource-planning.” Good baseline information is the foundation to good decision making.

Objective 7: Strong safety campaign implemented to increase safety awareness for canoers, kayakers and small motorized boaters on the Hudson River.

- By 2030, a safety informational campaign will be developed and implemented to increase safety awareness for canoers, kayakers and small motorized boaters on the Hudson River. This might include additional efforts of Hudson River outfitters, Hudson River Valley Greenway Water Trail, and coordination/outreach to commercial kayak retailers (i.e., LL Bean, Eastern Mountain Sports, Walmart, etc.) to place provide safety information to uninformed beginner kayakers at time of small boat purchase, information at launch sites and on the web. This would include integration of small boats conflicts with larger commercial ships and barges. There is also a strong small-boat safety program in Manhattan that might be examined as a model for the Hudson River estuary.

Bibliography

Axt, Katie. 2016. NYSDEC Region 2 Dredging Coordinator. Telephone Interview with Barbara Beall on November 1, 2016.

Beard, Nancy. 2016/2017. Access Coordinator for Hudson River Estuary Program. Telephone Interview with Barbara Beall on December 16, 2016 and comments on draft dated January 19, 2017.

Bergman, Frank. 2016. President Emeritus of the Hudson River Boat and Yacht Club Association. Telephone Interview with Barbara Beall on October 28, 2016.

Berrian, Robert. 2016/2017. Project Engineer, Navigation Channel, US Army Corps of Engineers. Telephone Communication with Barbara Beall in December 12, 2016, and email dated January 27, 2017.

Biggs, Alicia. 2016. Gateway on the Hudson. Report shows Port Expansion will bring more jobs, revenue. <http://www.timesunion.com/tuplus-business/article/Gateway-on-the-Hudson-9522023.php>. Reviewed 10/3/2016.

Collins, M.J and Miller, D. 2011. “Upper Hudson River (USA) Floodplain Change over the 20th Century.” (Rivers Research and Applications. 28: 1246-1253, 2012). Wiley Online Library 7 April 2011.

Coyne, Matt. 2016. Just How Much Cargo Is Shipped on the Hudson? LoHud - The Journal News, Part of the USA Today Network. <http://www.lohud.com/story/tech/science/environment/2016/08/07/hudson-river-cargo/88032470>.

De Avila, Joseph. 2016. Barging into Hudson Waterfronts. The Wall Street Journal. <http://www.wsj.com/articles/barging-into-hudson-waterfronts-1472257103>.

Giddy, Ian H., Keller, Scott and The Hudson River Watertrail Association. 2015. The Hudson River Water Trail Guide, 7th Edition. The Official Guide to the Hudson River Greenway Water Trail, and Map Set 1-4. Published by the Hudson River Watertrail Association, Inc. New York, NY. Pages 7 and 8.

- Hudson River Valley Greenway. 2016.
<http://www.hudsongreenway.ny.gov/Trailsandscenicbyways/LandTrail.aspx>. Accessed September 21, 2016 and October 27, 2016.
- Hudson River Valley Institute. 2003. State of the River Report 2003. American Heritage Rivers.
<https://www.hudsonrivervalley.org/navigator/pdfs/StateofRiver2003.pdf>.
- Hudson River Valley National Heritage Area. 2016. Heritage Site Guidebook, 2nd Edition. Greenway Heritage Conservancy, HRV, Inc.,
- Hudson River Valley National Heritage Area. 2016. News. Hudson River Valley National Heritage Area Announces New Website and Heritage Site Guidebook.
<http://www.hudsonrivervalley.com/about/press/news-story/hudson-river-valley-national-heritage-area-announces-new-website-and-heritage-site-guidebook/>.
- Hudson Riverkeeper and Scenic Hudson. 2014. Riverkeeper, Inc. and Scenic Hudson Comments on USCG-2014-0602, Review and Update of the New York/New Jersey Area Contingency Plan.
http://www.riverkeeper.org/wp-content/uploads/2014/10/Riverkeeper-Scenic-Hudson-Comments-USCG_2014_0602-ACP-Update-10_10_143.pdf.
- Ireland, Scott. 2016. Scott Ireland is a member of the Hudson River Pilot's Association. Telephone interview with Barbara Beall, with Andrew Peck and Terresa Bakner on September 21, 2016.
- Keller, Scott. 2016. Acting Executive Director, Hudson River Valley Greenway. Telephone Interview with Barbara Beall on October 28, 2016 and comments on draft dated December 23, 2016.
- Lawler, Matusky & Skelly Engineers, LLP and The Hudson Group LLP. 2005. "Swimming in the Hudson River, Feasibility Report on Potential Sites." Prepared for the Hudson River Estuary Program and the NYS Office of Parks, Recreation and Historic Preservation.
http://www.dec.ny.gov/docs/remediation_hudson_pdf/swimhudsonfearpt1.pdf.
- Miller, Daniel E. 2017. Hudson River Estuary Program. Email to Barbara Beall dated January 3, 2017.
- New York State. 2014. "Transporting Crude Oil in New York State: A Review of Incident Prevention and Response Capacity." Prepared by NYSDHSES, NYSDEC, NYSDOT, NYSDOH and NYSERDA." With Status Update. <https://www.eli.org/sites/default/files/docs/nyscrudeoilreport.pdf>. and <https://www.governor.ny.gov/sites/governor.ny.gov/files/atoms/files/CrudeOilUpdateReport.pdf>
- NYSDEC and Hudson River Estuary Program. Undated Hudson River Estuary Action Agenda 2015-2020.
<http://www.dec.ny.gov/docs/dhreaa15.pdf>
- NYSDEC and Hudson River Estuary Program. Undated. Hudson River Public Fishing & Boating Access.
http://www.dec.ny.gov/docs/remediation_hudson_pdf/hrefba.pdf. Document Properties indicate Last Updated

Navigation Safety and Natural Resource Interactions Team

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- Dan Shapley, Hudson River Riverkeeper