



# Hudson River Oil Spill Risk Assessment

# Volume 7: Spill Scenario Summaries

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### **Acknowledgments**

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The HROSRA research team acknowledges the invaluable inputs and discussions with Scenic Hudson over the course of the study period (September 2017 through May 2018), including the selection and development of the hypothetical spill scenarios. The contents of the report, data, analyses, findings, and conclusions are solely the responsibility of the research team and do not constitute any official position by Scenic Hudson. The Hudson River Oil Spill Risk Assessment was conducted as an independent, objective, technical analysis without any particular agenda or viewpoint except to provide quantitative and qualitative information that could be used to work to a common goal of spill prevention and preparedness. The study is intended to inform officials, decision-makers, stakeholders, and the general public about oil spill risk in the Hudson River.

The diligent efforts of the RPS SIMAP modeling team of Deborah Crowley, Jenna Ducharme, Matt Frediani, Emily Skeehan, and Matt Bernardo provided the necessary data, results, maps, and graphics that formed the foundation of much of the analysis in the HROSRA.

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### **Cover Photograph Credits**

The photographs on the report cover were taken by Dagmar Schmidt Etkin (Esopus Meadows Lighthouse and articulated tank barge) and Steve Kardian (bald eagle) on the Hudson River.

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### **Acronyms and Abbreviations**

ACP: Area Contingency Plan

AMPD: average most-probable discharge

**ATB:** articulated tank barge

**bbl:** barrels of oil (equivalent of 42 gallons)

**bbl/hr:** barrels per hour

BTEX: benzene, toluene, ethylbenzene, and xylene

**CBR:** crude-by-rail

**ERC:** Environmental Research Consulting

F: degrees Fahrenheit

ft: feet

gal: gallons

gpm: gallons per minute

**GRP:** geographic response plan

**GRS:** geographic response strategy

g/m<sup>2</sup>: grams per square meter

HFO: heavy fuel oil

**HHO:** home heating oil

hr: hours

kts: knots

Lat: latitude

**LFL:** lower flammability limit (lower end of the concentration range over which a flammable mixture of gas or vapor in air can be ignited at a given temperature and pressure)

Lon: longitude

mi: miles

mi<sup>2</sup>: square miles

mil: million

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mg/l: milligrams per liter

MMPD: maximum most-probable discharge

NCP: National Contingency Plan

**OSRO:** oil spill removal organization

**p:** probability

**psi:** pounds per square inch (pressure)

**RP:** responsible party

**SCAT:** Shoreline Cleanup Assessment Technique

**UFL:** upper flammability limit (upper end of the concentration range over which a flammable mixture of gas or vapor in air can be ignited at a given temperature and pressure)

**USCG:** US Coast Guard

**VRP:** vessel response plan

WCD: worst-case discharge

### **Hudson River Oil Spill Risk Assessment Report Volumes**

The Hudson River Oil Spill Risk Assessment (HROSRA) is composed of seven separate volumes that cover separate aspects of the study.

### **Executive Summary (HROSRA Volume 1)**

The first volume provides an overall summary of results in relatively *non-technical* terms, including:

- Purpose of study;
- Brief explanation of risk as "probability times consequences" and the way in which the study addresses these different factors:
- Brief discussion of oil spill basics;
- Results the "story" of each spill scenario, including the oil trajectory/fate/exposure, fire/explosion brief story (if applicable), and a verbal description of the consequence mitigation (response spill and fire emergency); and
- Brief summary of spill mitigation measures with respect to response preparedness and prevention.

### **HROSRA Volume 2**

The second volume provides an overview of the study approach and general introduction to unique features of the Hudson River.

#### **HROSRA Volume 3**

The third volume reviews the potential sources of oil spillage. It also presents the analyses of the probability of occurrences of spills of varying sizes from the potential sources under different conditions of traffic and oil transport.

#### **HROSRA Volume 4**

The fourth volume presents the analyses of the potential consequences or impacts of hypothetical spills, including the trajectory and fate of spills to the water, and the potential exposure of resources above thresholds of concern, based on oil modeling (including Appendices with detailed figures, etc.).

### **HROSRA Volume 5**

The fifth volume presents the analyses of potential consequences or impacts of hypothetical fire and explosion events that may occur in addition to oil spills.

#### **HROSRA Volume 6**

The sixth volume presents the analyses of spill mitigation measures to reduce the risk of spills through prevention, preparedness, and response. The volume includes response and preparedness considerations for the specific modeled scenarios, as well as overall response issues for the Hudson River. It also includes more generic descriptions of prevention measures (vessels, trains, facilities, etc.).

#### **HROSRA Volume 7**

The seventh volume presents the summary tables with data – including probabilities, spill modeling, fire/explosion analysis, and response considerations for each of the 72 modeled spill scenarios. This volume pulls together everything from HROSRA Volumes 3, 4, 5, and 6.

### **Research Team**

### Dagmar Schmidt Etkin, PhD (Environmental Research Consulting)

Dr. Etkin has 42 years of experience in environmental analysis–14 years investigating issues in population biology and ecological systems, and 28 years specializing in the analysis of oil spills. Since 1999, she has been president of Environmental Research Consulting (ERC) specializing in environmental risk assessment, and spill response and cost analyses. She has been an oil spill consultant to the US Coast Guard, EPA, NOAA, Army Corps of Engineers, the Bureau of Ocean Energy Management, the Bureau of Safety and Environmental Enforcement, various state governments, the Canadian government, the oil and shipping industries, and non-governmental organizations. She is internationally recognized as a spill expert and has been a member of the UN/IMO/UNEP/UNESCO Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) since 1997. She has a BA in Biology from University of Rochester, and received MA and PhD degrees from Harvard University in Organismic/Evolutionary Biology, specializing in ecological modeling and statistics.

### Deborah French McCay, PhD (RPS Ocean Science)

Dr. French McCay (formerly Dr. French) specializes in quantitative assessments and modeling of aquatic ecosystems and populations, oil and chemical transport and fates, and biological response to pollutants. She has developed water quality, food web and ecosystem models for freshwater, marine and wetland ecosystems. She is an expert in modeling of oil and chemical fates and effects, toxicity, exposure and the bioaccumulation of pollutants by biota, along with the effects of this contamination. Her population modeling work includes models for plankton, benthic invertebrates, fisheries, birds and mammals. These models have been used for impact, risk, and natural resource damage assessments, as well as for studies of the biological systems. She has provided expert testimony in hearings regarding environmental risk and impact assessments. She has over 30 years of experience in analyzing oil spills and is considered one of the leading international experts on the fate and effects of oil spills. She has a BA in Zoology from Rutgers College, and a PhD in Biological Oceanography from the Graduate School of Oceanography, University of Rhode Island.

#### Jill Rowe (RPS Ocean Science)

Jill Rowe specializes in biological and environmental data gathering, analysis and management; natural resource damage assessment (NRDA) modeling and analysis of pollutant fates and effects; ecological risk assessment; impact assessment of dredging and development projects, preparing sections of Environmental Impacts Statements; providing NEPA support, and GIS mapping and analysis. Ms. Rowe has applied her marine biological and GIS expertise to biological data set development, as well as mapping habitats and biological resource distributions that could ultimately be affected by oil/chemical spills and development projects. She performs quantitative assessments and modeling of aquatic ecosystems and populations, pollutant transport and fates, and biological response to pollutants. The populations to which she applies these models include plankton, benthic invertebrates, fisheries, birds and mammals. She has analyzed data and has applied water quality, food web and ecosystem models to case studies in freshwater, marine and wetland ecosystems. She has a BA in Biology from DePauw University, and an MS in Marine Biology from the College of Charleston.

### **Deborah Crowley (RPS Ocean Science)**

Deborah Crowley is a senior consulting environmental scientist and project manager at RPS. She has experience working on issues and projects related to various aspects of environmental science such as environmental data analysis, hydrodynamic and water quality modeling and analysis, coastal processes, oil and gas fate and transport assessment in the environment, operational discharge modeling and assessment, renewable energy project development assessment support, environmental impact assessment in coastal and marine environments and permitting and regulatory compliance analysis and support. Ms. Crowley's experience with renewable energy projects includes cable burial studies, wind resource assessment, climatology assessment including extremal analysis, wind turbine siting, turbine power production and site capacity analysis, turbine impacts assessment, turbine visualizations, regulatory, permitting and zoning review, planning and management of terrestrial met tower deployment and associated data management and analysis. Areas of experience include numerical modeling, model development and application, field program design and support, data analysis and visualization in Matlab<sup>TM</sup> and geospatial analysis in ArcGIS<sup>TM</sup>. She has a BS in Mechanical Engineering from Worcester Polytechnic Institute and an MS in Civil & Environmental Engineering from University of Rhode Island.

#### John W. Joeckel (SEAConsult LLC)

Mr. Joeckel is an executive management professional with a broad-based background in multi-modal transportation, oil, chemical and gas industry sectors, and manufacturing and production. He has extensive experience in legislative advocacy and regulatory compliance, crisis and consequence management, emergency preparedness and response, including hands-on response as an Incident Commander on multiple major emergency incidents and development of all hazard response/crisis management programs and plans including training and exercises. He has experience in ports, waterways and facility maritime security vulnerability analysis and security plan development including personnel training and exercise. Mr. Joeckel has a BS in Maritime Transportation from SUNY Maritime College, as well as many years of training in oil spill response. He has been involved in response research and development and supervising many spill response operations, including the BP Gulf of Mexico Deepwater Horizon incident, the Enbridge Pipeline Michigan oil tar sands crude oil spill in the Kalamazoo River, and the Exxon Valdez spill in Alaska.

### Andrew J. Wolford, PhD (Risknology, Inc.)

Dr. Wolford is founder and President of Risknology, Inc., a company specializing in risk analysis of hazardous facilities. He is an expert risk engineer with 29 years of experience. He has directed risk assessments on a diverse range of engineered systems including; offshore and onshore oil and gas installations, mobile offshore drilling units, marine and land-based transportation systems, chemical and nuclear fuel processing plants, nuclear power and test reactors, and the Space Shuttle program. He has a BA in Physics from Wittenberg University, a BA in Nuclear Engineering from Georgia Institute of Technology, and a ScD from Massachusetts Institute of Technology.

### **Keys to Summary Tables**

The large amount of data generated in the modeling and analysis of the 72 hypothetical oil spill scenarios and five fire/explosion scenarios were summarized into tables that capture the key points. The more detailed SIMAP modeling results are presented in HROSRA Volume 4 and its appendices. The spill response considerations for these spill scenarios are presented in greater detail in HROSRA Volume 6. The fire/explosion scenarios are described in greater detail in HROSRA Volume 5.

### **Key to Spill Scenario Results Summary Tables**

The table template below was used to summarize the results from the modeling and analysis of the 72 hypothetical spill scenarios. An annotated version is shown (broken into section components). The first section describes the scenario. This unique description defines each of the 72 scenarios.

	Location	Source	Volume	Oil Type	Season	Tide Stage
	Hypothetical release point or	Vessel type or train	Release or spill volume in barrels	Bakken crude, home heating oil	Spring-high flow	High or low tide at the
Scenario Description	stretch (for	tram	(bbl)	(HHO), heavy	Summer-low	spill location
•	trains)			fuel oil, diluted	flow	
				bitumen, or	Winter-medium	
				gasoline	flow with ice	

The second section presents the probabilities of spills like the one in the hypothetical scenario. The purpose of this is to put a probabilistic perspective on the spill, which helps to provide a sense of the risk. The spill scenario, which may be very large, is relatively unlikely. The probabilities indicated are for spills of this type (source) and/or volume and *not for the specific location*. For example, it provides the likelihood of a spill of 150,000 bbl from an articulated tank barge (ATB) *somewhere along the river in the study zone*, not specifically at the proposed Kingston Anchorage. The probability that the incident would happen in exactly the same spot (and under exactly the same circumstances) as the hypothetical spill scenario are much smaller. The probabilities of the spill scenarios by volume are based on the likelihood of a spill *anywhere* along the study area of the Hudson River, not specifically in that location. In theory, the probability of spillage needs to be spread out over the 115-mile length of the river.

	Annual Probability An	ywhere in Hudson River	Historical Frequ (2000-	
	Spill of Type (Any Volume)	Spill of this Type and Volume	US	Hudson
	Annual probability of spill from	Annual probability of spill in	Spill number of	Spill number of
Spill	this type of source in Hudson	Hudson from this source and of this	this volume (or	this volume (or
Probability	regardless of volume	volume (or larger)	more) from this	more) from this
	(Any oil type involved)	(Any oil type involved)	source that	source that
			occurred	occurred
			annually in the	annually in
			US 2000-2015.	Hudson River
				2000-2015.

The third section specifies the environmental and conditional inputs into the modeling. If the same spill (volume and oil type) were to occur at a different time the outcome would be different. It is important to note that these are hypothetical spills. The release date/time does not indicate that a spill actually occurred on this date. The specific environmental conditions (weather, wind, currents, tide) on that specific historic

date were applied in the modeling. The results show what would have happened had there been a spill of that volume for that type of oil in that location.

		Lat/Lon	Release Rate	Release Date/Time	Run Duration	Winds	Water Temperature
		Release location	Spill rate as	Hypothetical	Oil spill	Direction and	Assumed
	Conditions	in decimal	bbl/hour over the	release date/	trajectory and	speed at time	water
'		degrees	course of number	time (weather,	fate model was	of release	temperature
			of hours	wind, currents	run for this		at time of
				on that date)	length of time		release
					(i.e., 30 days)		

The fourth section provides the mass balance or fate of the spilled oil after the duration of the model run of 30 days. It shows what happened to the oil after it spilled. The tables list the amount of oil on the water surface and in the water at 30 days post-spill. Typically, the maximum amount in these two environmental compartments occurs earlier in the spill simulation, such that little to none might be in these compartments after 30 days. The amounts in the atmosphere (i.e., evaporated), on shorelines and sediments, and degraded (by microbes and light-induced photo-degradation) increase in time as the processes leading to these fates ensue.

For each scenario, the sum of all the listed compartmental percentages adds up to, but may be less than, 100%. The remaining fate (completing the sum to 100%) is that amount of oil that has exited the modeled domain into New York Harbor.

		Mass Balance at End of Model Run (After 30 Days)								
	Fate	Surface	Atmosphere	Water Colu	mn Sediment	Ashore	Degraded			
	%	Percent of orig	ginal oil spilled t	hat is in each o	f these categories	at the end of 30 day	'S			
	bbl	Volume (in bb	ol) of original oil	spilled that is i	n each of these ca	tegories at the end	of 30 days			
		Spatial Extent of Exposure over Threshold (Up to 30 Days After Spill)								
SIMAP	Wat	ter (Volume) – E	cological S	Surface (Area	x Days Exposed)	Shoreline (Length)				
Modeling Results				cological <sup>3</sup> 10 g/m <sup>2</sup>	Socioeconomic (0.01 g/m²)	Ecological <sup>4</sup> 100 g/m <sup>2</sup>	Socioeconomic 1 g/m <sup>2</sup>			
Kesuits	(1 mg/l) <sup>1</sup> (0.001 mg/l)  Overall volume (surface area times water depth) affected to concentrations of oil above the threshold		ove the m	Water surface area exposed to concentrations above threshold multiplied by the days of exposure.		Total shore length (miles) oiled above threshold that could potentially cause ecological effects.				

<sup>&</sup>lt;sup>1</sup> 1 mg/l (1 milligram per liter) is the equivalent of 1 part per million (ppm).

<sup>&</sup>lt;sup>2</sup> 0.001 mg/l = 1 microgram/l = 1 part per billion (ppb). Water column effects for both ecological and socioeconomic (e.g., seafood) resources could potentially occur at concentrations exceeding 1 ppb. A threshold of 1 ppb is typically used as a screening threshold for potential effects on sensitive organisms and early life stages (e.g., ichthyoplankton). This would be a conservative screening threshold for most adult and juvenile pelagic and demersal fish and invertebrates.

<sup>&</sup>lt;sup>3</sup> Mortality of birds on water has been observed at and above this threshold. Sublethal effects on marine mammals, sea turtles, and floating *Sargassum* communities are of concern.

<sup>&</sup>lt;sup>4</sup> This is a screening threshold for potential ecological effects on shoreline flora and fauna, based upon a synthesis of the literature showing that shoreline life has been affected by this degree of oiling. Sublethal effects on epifaunal intertidal invertebrates on hard substrates and on sediments have been observed where oiling exceeds this threshold.

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The oil spill modeling summaries include the extent of oiling over specified thresholds. There are different thresholds for oil exposure above which ecological effects and socioeconomic (including cultural) impacts might occur. The basis for the thresholds is explained in HROSRA Volume 4 in the description of the model approach. The thresholds for socioeconomic impacts are much lower than those for potential ecological effects. There would be effects on tourism, property, etc. with even light amount of staining which occurs at much lower oil concentrations than would actually cause any ecological damage.

Note that all of these potential impacts assume that there has been no mitigation by spill response or protective booming strategies. In an actual spill situation, some of the oiled areas may be protected by timely and effective deployment of booms, assuming weather and current conditions are not counteracting the effectiveness. In addition, there may be some oil removal on the water surface that may reduce some of the spread and stranding of oil.

The fifth section specifies oil exposures on different types of shorelines and habitats that could cause some degree of ecological effects. Again, these oil exposures assume that there has been no mitigation by spill response or protective booming strategies. In an actual spill situation, some of the oiled areas may be protected by timely and effective deployment of booms, assuming weather and current conditions are not counteracting the effectiveness. In addition, there may be some oil removal on the water surface that may reduce some of the spread and stranding of oil.

	Sh	oreline Exposure by S	Shore Type (Miles over	r Ecological Thresho	ld)			
	Bedrock	Unconsolidated Rock Sand Beach		Redrock		Mud or Timber	Artificial Shore	
	Miles of shoreline of different types oiled over the ecological threshold by shoreline type.							
Englasiaal	Brackish/Estuarine Wetland Habitats Exposed (Miles over Ecological Threshold)							
Ecological Shoreline	Saltmarsh Upper Intertidal Mix		Lower Intertidal Mix	Phragmites Wetland	Shrub/Scrub and Forested Wetland			
Exposures	Miles of brackish/estuarine wetland of different types oiled over the ecological threshold by wetland type.							
	Freshwater Wetland Habitats Exposed (Miles over Ecological Threshold)							
	Cattail Marsh	Upper Intertidal Mix	Lower Intertidal Mix	Phragmites Wetland	Shrub/Scrub and Forested Wetland			
	Miles of freshwater	Miles of freshwater wetland of different types oiled over the ecological threshold by wetland type.						

The sixth section includes a brief summary of potential socioeconomic and cultural effects of the spill and/or the response operations for the specific scenario.<sup>5</sup> Again, there may have been some mitigation of these effects with timely and effective spill response.

	Potential Socioeconomic Impacts from Spill and Response Operations
Socioeconomic Impacts	Potential socioeconomic impacts, including: water intakes potentially affected by oil in water column; port activities affected by presence of oil and/or response; tourism impacts by presence of oil and/or response; other notable impacts to cultural and socioeconomic features.

<sup>&</sup>lt;sup>5</sup> Impacts are noted by community or stretches of river from X community to Y community on the west and east shores. A list of the communities by river mile in the GRPs may be found in Appendix A of this volume. More detailed information about the riverfront and river vicinity features of the communities and towns can be found in HROSRA Volume 2.

<sup>15</sup> Hudson River Oil Spill Risk Assessment Volume 7: Spill Scenario Summaries

This section describes the level of response activation that would be required as well as classifies the spill volume with respect to the National Contingency Plan (NCP) and USCG regulations. The NCP classifies all inland spills (including Hudson River spills) of 10,000 gallons (238 bbl) or larger as "major spills." The USCG considers a worst-case discharge (WCD) spill to be the largest foreseeable discharge – usually the size of the largest storage tank. An average most-probable discharge (AMPD) for a facility is 50 bbl or 1% of the WCD, whichever is smaller. A facility maximum most-probable discharge (MMPD) is 1,200 bbl or 10% of the WCD, whichever is smaller. For vessels, the WCD is the discharge of the vessel's entire fuel or cargo oil, whichever is greater. An AMPD is 50 bbl or 1% of the oil cargo, whichever is smaller. For a vessel with an oil capacity of 25,000 bbl or greater, the MMPD is 2,500 bbl. For vessel with a capacity of less than 25,000 bbl, the MMPD is 20% of the vessel's oil capacity. *Note that there are no current definitions for AMPD, MMPD, or WCD for rail spills.* 

The amount of equipment specified by the tier response requirements merely specifies the minimum required. This does not mean that this is the only equipment that would be required to conduct an effective response operation. The areas specified in geographic response plans (GRPs) and geographic response strategies (GRSs) that would actually be affected based on the trajectory and spread of the oil are identified. This does not mean that other geographic areas would not prepare (deploy boom, etc.) if this hypothetical spill were to occur. In the event of an actual spill, the trajectory (path) and spread of the spill will not be accurately predicted.

The rail-related GRPs are more specifically designed for emergency response railroad-related spills. In the summary tables they only apply to the immediate area around the track on which the accident occurred. Any spillage into the river is dealt with in the river-related GRPs and GRSs. The oil may flow a considerable distance once it enters the river. Therefore, there may be many miles of river affected. For the GRPs and GRSs, the plans that would most likely be activated in the first seven days are noted. During this time there might be floating oil on the water surface that could be diverted or excluded from sensitive areas that are boomed according to the GRP or GRS.

In addition, the specific challenges with respect to protective booming, mechanical containment and recovery operations, and shoreline cleanup with this particular spill scenario are summarized.

Note that the response equipment described is the minimum that must be on site by the prescribed time. There would most likely be at least a minimal amount of equipment that would be deployed as soon as possible when the spill was discovered based on equipment available on the vessel, at the facility, or at the nearest response equipment cache. The amount of equipment described would not be sufficient for a full response to a worst-case discharge or even a moderately-large spill. The EDRC is not necessarily reflective of the actual amount of oil that could be recovered in field conditions.

	Response Equipment and Plan Activation								
	NCP and USCG	Tier Response Requirements				GRPs/ GRSs Activated (7 days)			
	Туре	Tier 1 (h	rs)	Tier 2 (hrs)	Tier 3 (hrs)	Rail	Miles	River Miles	
Spill Response	NCP volume classification; USCG volume classification for response planning.	each steppe Plan. This is on scene at Protective b Containmer Oil recovery	Required response times and response equipment for ach stepped tier based on the National Contingency Plan. This is the minimum equipment that needs to be a scene at the spill scene in the specified time.  Protective boom (ft) Containment boom (ft) Dil recovery equipment (bbl/day EDRC <sup>6</sup> ) Recovered oil storage (bbl)					River-related GRPs and GRSs that would be activated in the first 7 days of spill response.	
	Response Overview: Expected Outcomes and Challenges								
	Protective Booming		Mecha	nical Recovery	Shoreline Cle	Shoreline Cleanup		ther Challenges	
	Issues related to the protective (exclust diversionary) book sensitive sites expectations spill scenario	sion and original ls more original ls mo	nechan	elated to the ical recovery of cted in this spill	Issues related to the shoreline cleanup of oil expected in this spill		occur ii	her challenges that may cur in this spill scenario g., submerged oil).	

### **Key to Summary Tables for Fire/Explosion Scenarios**

For each of five of the hypothetical scenarios, there was an additional scenario added that assumes that there is an ignition, which could cause a pool fire and/or a vapor cloud explosion. For these scenarios, an additional summary table is included. The first three sections are identical to the ones for the spill scenarios, as described above.

The fourth section provides the probabilities that there will be a pool fire and/or vapor cloud explosion *if there is first a spill in that location*, and the probability that there would be pool fire and/or vapor cloud explosion at all somewhere along the river. The second set of probabilities incorporates the probability that there would be a spill of this volume. It is important to remember that the probabilities of these fire/explosion events occurring first depend on the probability of there being a spill or release of oil. Then the conditions need to favor a fire or explosion, including a source of ignition or pressure buildup. The probabilities of a fire or explosion were calculated based on the conditions at the specific hypothetical spill locations. The probabilities of the spill scenarios by volume are based on the likelihood of a spill anywhere along the study area of the Hudson River, not specifically in that location. In theory, the probability of spillage needs to be spread out over the 115-mile length of the river.

Pool Fire	Pool Fire	Vapor Cloud	Vapor Cloud Explosion
Probability/Incident	Probability	Explosion/Incident	Probability
 spill incident, there is a	of this size would occur	spill incident, there is a	

The fifth section describes the general types of emergency response that might be required in the hypothetical scenario, as well as the extent of the required evacuation zone. Any relevant health and safety issues important to the response are also summarized.

<sup>&</sup>lt;sup>6</sup> Effective daily recovery capacity.

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Fire/Explosion	Emergency Response	Evacuation Zone	Health/Safety Issues
- I	Emergency response actions.	Recommendations for evacuation.	Potential health/safety issues for
Response	Emergency response actions.	Recommendations for evacuation.	responders and public.

The sixth section summarizes the specific safety impacts of a fire or explosion.

	Flammable		Impa	acts from Fire (A	cres)							
	Distance	Total	Residential	Commercial	Commercial Industrial							
Cafata I	Distance in feet	Acres affected	Acres affected	Acres affected	Acres affected							
Safety Impacts	Downwind		Impacts from Explosion (Acres)									
	Distance	Total	Residential	Commercial	Industrial	<b>Public Use</b>						
	Distance in miles	Acres affected	Acres affected	Acres affected	Acres affected	Acres affected						

### **Sequential Probabilities for Scenarios**

The probability that any one of the hypothetical scenarios with or without fires and explosions would occur on the Hudson River depends on a series of probabilities.

When several independent events need to occur for a final outcome to occur, the probabilities of each of the independent events are multiplied together. For example, in dice games, the probability of getting two "threes" when rolling dice is the probability of getting a "three" on the first die multiplied by the probability of getting a "three" on the second die. There is a 1 in 6 probability of getting a "three" with each die. The probability gets smaller with each added die.

```
"Three" on one die = 1/6 = 0.167 (a 1 in 6 chance)
```

"Three" on two dice = (1/6) times (1/6) = 0.0278 (a 1 in 36 chance)

"Three" on three dice = (1/6) times (1/6) times (1/6) = 0.0046 (a 1 in 216 chance)

The different events can have different probabilities that also can be multiplied together to calculate the probability of all of the events occurring. For example, the probability of rolling a "six" on two dice and also getting a "heads" on a coin toss is:

```
"Six" on two dice plus "heads" = (1/6) times (1/6) times (1/2) = 0.014 (a 1 in 72 chance)
```

This chance is with each roll/toss opportunity. If the action is repeated many times, the probability increases.

For the spill and fire/explosion scenarios, a sample series of hypothetical probabilities is shown in Figure 1. This demonstrates the sequential probabilities that need to be multiplied to determine the likelihood of a tanker fire or explosion somewhere along the Hudson River for a single tanker trip.

This *hypothetical* example shows that the probability of an accident with a tanker is 0.0035 each time the tanker transits the Hudson River. Then there is a 0.19 chance that the accident will result in a spill of any volume – small to large. Then, there is a 0.0001 chance that the spill will be a large (150,000 bbl) incident. Then there is a 0.10 chance that there is an ignition that causes the spilled oil to burn and/or explode. This series of probabilities are multiplied together to give a 0.000000007 chance of a tanker fire

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or explosion each time a loaded tanker takes a trip up or down the river. That's a 1 in 154 million chance. But, this is for each time there is a tanker trip.

If there are 1,000 loaded transits per year, this increases the *annual* probability to 1 in 154,000. Over 25 years, this means a probability of 1 in 6,000. But, one also needs to consider that there are 115 miles of the Hudson River between Spuyten Duyvil and the Federal Lock at Troy. If the incident is just as likely to occur anywhere along the 115 miles and the effect of such a fire/explosion incident is felt in a two-mile radius, the probabilities can be roughly divided into about 58 separate zones. The probability of the incident happening in any one specific zone during those 25 years is about 1 in 348,000.

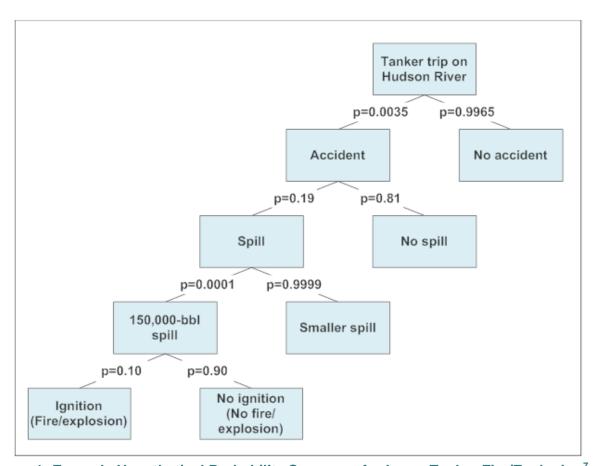


Figure 1: Example Hypothetical Probability Sequence for Large Tanker Fire/Explosion<sup>7</sup>

<sup>&</sup>lt;sup>7</sup> This figure demonstrates the way in which sequential probabilities are multiplied together. The probability values are hypothetical.

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## Albany 155,000-bbl Bakken Crude Tanker Loading Accident

Albany 155,000-bbl Bakken Crude Spill (Spring-High Tide) Effects

Scenario	Loca	tion		ource	V	olume	1	Oil Ty	pe	Season		Tide Stage	
Description	Port of A	Albany		r loading nt (dock)	155	5,000 bbl	Ва	ıkken o	crude	Spring		High	
a		Annu	al Prob	ability Any	where	in Hudson	Rive	r		Historical Annual Frequency (2000-2015)			
Spill Probability	Spi	ll of Typ	e (Any '	Volume)	S	pill of Type	and	Volun	ne	US		Hudson	
		0.7	32			0.000				0		0	
G 11.1	Lat/l	Lon	Relea	se Rate		Release te/Time	Model Run  Duration			Winds		Water Temperature	
Conditions	42.61 -73.76			0 bbl/hr r 4 hrs		pril 2015 :00am		30 da	ys	South / light (<10 kts)	t	46°F	
	73.70	3020	0,00	Mass Balance at End of Model Run (After			(After 3						
	Fate	Surf	ace	Atmosp	here	Water Colum	ı	Sec	diment	Ashor	e	Degraded	
	%	0.1	%	45.09	6	36.5%			1.0%	6.4%		10.9%	
SIMAP Modeling	bbl	15	6	69,80	6	56,508			1,541	9,907	1	16,932	
Results	Spatial Extent of Exposure over Threshold (Up to 30									•			
	Water Whol	(Volum		ological ssolved		face (Area x	•	-	osed) nomic	Shore Ecologica		(Length) Socioeconomic	
	(1 m			01 mg/l)		cological l0 g/m²)		(0.01 g		(100 g/m <sup>2</sup>		$(1 \text{ g/m}^2)$	
	704,875	mil gal	297,08	297,084 mil gal 83 mi²-days 84 mi²-c				days	200 mi		240 mi		
						Shore Type	(Mi	les ove	r Ecolo	gical Thresho	ld)		
	Bee	drock		Inconsolid Rock	ated	Sand	Beac	h	Mud	or Timber	A	artificial Shore	
	21.3 mi		90.8 mi		1.3	mi		(	50.7 mi		0 mi		
Ecological		Brac								Ecological Tl			
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	tidal Lower Int Mix				Phragmites Wetland		rub/Scrub and rested Wetland	
Exposures	0.	1 mi		0 mi		0.1	mi			0.6 mi		0 mi	
		F				<u> </u>				logical Thres			
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland	
	2.	9 mi		15 mi		5.4	mi			1.5 mi		0.2 mi	
	D					_		_	_	onse Operati			
										ighout river fo		east several ffic. Evacuation	
	of popul	ated area	s could	cause effec	ts on c	ommunities	and b	usines	ses. 240	miles of shore	eline	would be oiled	
~ .										eaches, parks,		real estate focused on areas	
Socioeconomic Impacts												l property, and	
impacts										ton to Albany,			
										ed in other tow aer Mile 144:			
	Water intakes that may be affected include: OGS Mile 145; AMRI Rensselaer Mile 144; PSE&G Mile 141; Bethlehem Mile 137; Castleton Mile 136; Ulster Mile 96; Rondout Creek & Rhinebeck Village Mile 91; Port												
	Ewen M river.	ile 89. A	dditiona	l precaution	nary fis	shing advisor	ries v	vould l	ikely be	instituted for	much	or all of the	
	11101.												

# Albany 155,000-bbl Bakken Crude Spill (Spring-High Tide) Response

			Re	esponse Equipment	and Plan Activation	_		
	NCP and		Tier	Response Requirer	nents	Gl	RPs/ GRS (7 d	s Activated ays)
	USCG Type	Tier 1 (24 hrs)		Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/d 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	1	n/a	55 river miles Mile 90-145 2016-47 to 2016-6
		R	esponse	Overview: Expecte	d Outcomes and Cha	allenges	5	
	Protective I	Booming	Mech	anical Recovery	Shoreline Cleanu	ıp	Other	Challenges
Spill Response	River currents 0.3 kts on floo kts on ebb, wil boom effective containment at diversionary b configurations angled to preve entrainment ar over; exclusion deflection conto be used to p sensitive areas	d and 0.8 ll reduce eness, nd oom to be ent nd splash n and figurations rotect	rapid sj reduce be reco mechan floating skimme shorelin boom a	nically; mobilize g self-propelled ers; set up ne containment ureas with n-trucks and	Approximately 6% of shoreline. Perform SCAT; wetland flush some substrate remordue to penetration on sandy beaches; oiled dock structures; oiled debris removal.	ning; val i	Bakken sp significan high benz area arour Potential oil in high areas; wet may be ch disturband during res cause effe for entrain in water c to water in kill conce	t danger, as are ene vapors in ad the spill. for submerged a-sediment cland access hallenge; the of wetlands aponse may exts; potential ament of 37% olumn leading at the tracking, the tracking,

# Albany 155,000-bbl Bakken Crude Spill (Spring-Low Tide) Effects

	_		~		_	,		011.77			mi i C		
Scenario	Loca	tion		ource	V	olume		Oil Ty	pe	Season		Tide Stage	
Description	Port of A	Albany		r loading nt (dock)	155	5,000 bbl	Ва	akken c	crude	Spring		Low	
Spill		Annu	al Proba	ability Any	where	in Hudson	Rive	er		Historical Annual Frequency (2000-2015)			
Probability	Spi	ll of Typ	e (Any \	Volume)	S	pill of Type	and	Volun	ne	US		Hudson	
·		0.7	32			0.000	0015	5		0		0	
Conditions	Lat/I			se Rate	Da	Release te/Time		Model Run Duration		Winds		Water Temperature	
Conditions	42.61 -73.70			0 bbl/hr r 4 hrs		ril 2015 00am		30 da	ys	South / light (<10 kts)		46°F	
				Mass Ba	ss Balance at End of Model Run (After			After 3	0 Days)				
	Fate	Surf	ace	Atmosp	here	Water Column	l	Sec	diment	Ashor	e	Degraded	
	%	0.1	%	46.99	6	34.7%		1	1.2%	6.9%		10.2%	
SIMAP Modeling	bbl	21	15 72,620 53,740 1,901						,901	10,655	5	15,741	
Results			Spatial	Extent of	Expos	ure over Th	resh	old (U	p to 30	Days After Sp	oill)		
		· (Volum				face (Area x						(Length)	
	Whol			ssolved		cological		cioeco		Ecologica (100 g/m <sup>2</sup>		Socioeconomic (1 g/m²)	
	(1 m 702,725			<b>01 mg/l)</b> ( <b>10 g/m²</b> ) 88 mil gal 92 mi²-days			( <b>0.01 g/m<sup>2</sup></b> ) 94 mi <sup>2</sup> -days			211 mi	,	249 mi	
	702,720	IIII gui				•				gical Thresho	ld)	2.7.111	
	Redrock Uncon			Jnconsolid Rock		Sand 1				or Timber		rtificial Shore	
	21.9 mi		98.3 n	ni	1.9	mi			63.9 mi		0 mi		
		Brac	kish/Est	tuarine Wo	etland Habitats Exposed (Miles over				les over	Ecological Th	resh	old)	
Ecological Shoreline	Salt	marsh	U	pper Inter Mix	tidal	Lower Intertidal Mix		Phragmites Wetland		Shrub/Scrub and Forested Wetland			
Exposures	0.	1 mi		0 mi		0.2	mi			0.8 mi		0 mi	
		F	`reshwa	ter Wetlar	d Hab	itats Expos	ed (N	Ailes o	ver Eco	logical Thresl	hold)		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland	
	3.	1 mi		13.7 mi		5.7	mi			1.4 mi		0.4 mi	
						_		_	_	_			
Socioeconomic Impacts	days; evi of popul above th would be more hea shorefro shore fro Water in Bethlehe	Response operations may cause major impacts to ports in Albany and throughout river for at least several days; evacuations and precautionary clearance zones might cause further impacts to vessel traffic. Evacuation of populated areas could cause effects on communities and businesses. 249 miles of shoreline would be oiled above the level of concern for socioeconomic effects; shorefront marinas, beaches, parks, and real estate would be affected by oil, including residue and odor. SCAT operations and cleanup would be focused on areas more heavily oiled (about 211 miles). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate would be most affected on the west shore from Kingston to Albany, and on the east shore from Rhinebeck to Rensselaer. Additional impacts may be experienced in other towns along the river. Water intakes that may be affected include: OGS Mile 145; AMRI Rensselaer Mile 144; PSE&G Mile 141; Bethlehem Mile 137; Castleton Mile 136; Ulster Mile 96; Rondout Creek & Rhinebeck Village Mile 91; Port Ewen Mile 89. Additional precautionary fishing advisories would likely be instituted for much or all of the river.											

# Albany 155,000-bbl Bakken Crude Spill (Spring-Low Tide) Response

			R	esponse Equipment	and Plan Activation	n	_	
	NCP and		Tier	Response Requiren	nents	G		Ss Activated ays)
	USCG Type	Tier 1 (24	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/c 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	1	n/a	55 river miles Mile 90-145 2016-47 to 2016-6
		R	esponse	e Overview: Expecte	ed Outcomes and C	halleng	es	
	Protective I	Booming		hanical Recovery	Shoreline Clear	nup	Othe	r Challenges
Spill Response	River currents 0.3 kts on floo kts on ebb, wil boom effective containment at diversionary b configurations angled to preventrainment ar over; exclusion deflection con to be used to p sensitive areas	d and 0.8 ll reduce eness, nd oom to be ent nd splash n and figurations protect	rapid s reduce be reco mecha floatin skimm shoreli boom	vaporation and spreading will amount that can overed inically; mobilize g self-propelled lers; set up ine containment areas with m-trucks and lers.	Approximately 7% end up on shoreline Perform SCAT; we flushing; some sub removal due to penetration on sand beaches; oiled docl structures; oiled de removal.	e. etland strate ly k	Bakken significa high ben area arou Potentia oil in hig areas; w may be o disturban during re cause effor entra in water to water kill conductors	bility during a spill is a ant danger, as are tzene vapors in and the spill. I for submerged gh-sediment etland access challenge; ance of wetlands esponse may fects; potential inment of 35% column leading intake and fish terns; perform lumn tracking, nonitoring.

# Albany 155,000-bbl Bakken Crude Spill (Summer-High Tide) Effects

					_	•							
Scenario	Loca	tion		ource	V	olume		Oil Ty	pe	Season		Tide Stage	
Description	Port of A	Albany		r loading ent (dock)	155	5,000 bbl	Ва	akken (	crude	Summer		High	
Spill		Annu	al Prob	ability Any	where	in Hudson	Rive	er		Historical Annual Frequency (2000-2015)			
Probability	Spi	ll of Typ	e (Any `	Volume)	S	pill of Type	and	Volun	ne	US		Hudson	
		0.7	32			0.000	00015	5		0		0	
Conditions	Lat/	Lon	Relea	ase Rate	Da	Release te/Time	Model Run Duration			Winds		Water Temperature	
Conditions	42.61 -73.70			0 bbl/hr r 4 hrs		August 1:30pm		30 da	ys	South / light (<10 kts)	t	77°F	
				Mass Ba	ass Balance at End of Model Run (A			(After 3	0 Days)				
	Fate	Surf	ace	Atmospl	here	Water Column	1	Sec	diment	Ashore	e	Degraded	
	%	0.19	%	50.4%	50.4% 32.9			C	).4%	1.0%		15.2%	
SIMAP Modeling	bbl	83						633	1,475		23,570		
Results		Spatial Extent of Exposure over Threshold (Up to 30						p to 30	Days After Sp	oill)			
		(Volum		_			x Days Exposed)		-			Length)	
	(1 mg/l) (0			Dissolved (0.001 mg/l)				cioeco (0.01 g	nomic g/m²)	Ecologica (100 g/m		Socioeconomi c (1 g/m²)	
	3,669 n	nil gal	2,711	mil gal	27 1	mi <sup>2</sup> -days	2	7 mi <sup>2</sup> -	days	12 mi		18 mi	
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)											
	Bedrock			Jnconsolid Rock	ated	Sand 1	Beac	h	Mud	or Timber	Aı	rtificial Shore	
	0	mi		9.5 mi	0 mi			2	.6 mi		0 mi		
Ecological		Brac					_			Ecological Th		•	
Shoreline	Salt	marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites Vetland		rub/Scrub and rested Wetland	
Exposures	(	) mi		0 mi		0 1			<u>_</u>	0 mi	101	0 mi	
		F	reshwa	ter Wetlar	nd Hab	itats Expos	ed (N	Miles o	ver Eco	logical Thresl	hold)		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland	
	C	) mi		0 mi		0 1	mi			0 mi		0 mi	
										onse Operatio			
Socioeconomic Impacts	days; even of popul above th would be more her shorefro shore fro intakes t	acuations ated area e level of e affected avily oile nt real es om Schod hat may l	and press could of concern by oil, d (about tate would ack to Toe affect	ecautionary cause effect in for socioe including r t 12 miles). ald be most froy. Addit- ted include:	clearants on concernation of the conomic of the con	ommunities on the modern some communities on the we on the we on the we of the modern some communities of the modern some co	ight of and be careful carinal st sho be ex MRI	cause fousines front m operat as, bead ore from Experien	urther in urther in urinas, b ions and ches, ind m Bethle ced in of elaer Mi	niles of shorel eaches, parks,	el traffine wand red be freial py, and the G Mile	fic. Evacuation ould be oiled real estate focused on areas property, and don the east eriver. Water e 141	

# Albany 155,000-bbl Bakken Crude Spill (Summer-High Tide) Response

			Re	esponse Equipment	and Plan Activation	1		
	NCP and		Tier	Response Require	ments	G	RPs/ GRS (7 d	s Activated ays)
	USCG Type	Tier 1 (2	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rai	l Miles	River Miles
	Major WCD	25,000 ft t 1,000 ft + skimming 1,875 bbl/ 3,750 bbl s	300 per system day	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	n/a		10 river miles Mile 145-155 2016-6 to 2016-1
		Re	esponse	Overview: Expecte	d Outcomes and Ch	allenge	es	
	Protective Bo	ooming		anical Recovery	Shoreline Clean	ıp	Other	Challenges
Spill Response	River currents b 0.3 kts on flood kts on ebb, will boom effectiven containment and diversionary boo configurations t angled to prever entrainment and over; exclusion deflection config to be used to pre sensitive areas.	and 0.8 reduce ness, dom obe nt d splash and gurations	rapid spreduce a be recomechan floating skimme shoreling boom a	self-propelled ers; set up ne containment reas with n-trucks and	Only about 1% is anticipated to cause shoreline contamina Perform SCAT; wet flushing; some substremoval due to penetration on sandy beaches; oiled dock structures; oiled deb removal.	land rate	Bakken s significan high benz area arou. Potential oil in high areas; we may be cl disturban during res cause effor entrai in water of to water i kill conce	at danger, as are gene vapors in and the spill. In the spill of the spill of the sediment than access and lenge; are of wetlands sponse may exts; potential ament of 30% column leading antake and fish erns; perform the sponse may extend the spill of the

# Albany 155,000-bbl Bakken Crude Spill (Summer-Low Tide) Effects

Scenario	Loca	tion		ource	7	<b>Volume</b>		Oil Ty	ype	Season		Tide Stage	
Description	Port of A	Albany		er loading ent (dock)	15	5,000 bbl	В	akken	crude	Summer		Low	
Spill		Annı	ıal Prob	ability Any	where	e in Hudson	Rive	er		Historical Annual Frequency (2000-2015)			
Probability	Spi	ll of Typ	e (Any `	Volume)	S	pill of Type	and	Volum	e	US		Hudson	
		0.7	732			0.000	0001	5		0		0	
Conditions	Lat/I			ase Rate	Da	Release ate/Time	Model Run Duration			Winds		Water Temperature	
Contrictions	42.616 -73.76			0 bbl/hr r 4 hrs		igust 2015 5:00am		30 da	ys	South / ligh (<10 kts)	t	77°F	
		Mass Balance at End of Model Run (After 30		Days)									
	Fate	Surf	ace	Atmosph	nere	Water Column		Se	diment	Ashore	e	Degraded	
	%	0.0	%	50.7%	ó	31.3%		(	0.3%	0.9%		16.8%	
SIMAP Modeling	bbl	68	3	78,55	58 48,482 393				1,392		26,107		
Results		Spatial Extent of Exposure over Threshold (Up to 30 I				ays After Spi	ill)						
		`	olume) – Ecological			face (Area x						(Length)	
	Whole Oil (1 mg/l)			Dissolved (0.001 mg/l)		cological 10 g/m²)		Socioeconomic (0.01 g/m²)		Ecologica (100 g/m²		Socioeconomic (1 g/m²)	
	3,070 m	nil gal	2,121	mil gal	30	mi <sup>2</sup> -days	3	80 mi <sup>2</sup> -0	days	11 mi		17 mi	
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)  Unconsolidated											
	Bedrock			Unconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	artificial Shore	
	C	) mi		9.2 mi		0 mi			2	2.2 mi		0 mi	
Ecological		Bra								Ecological Th			
Shoreline	Salt	marsh	U	Jpper Inter Mix	tidal	Lower II				Phragmites Wetland		nrub/Scrub and prested Wetland	
Exposures	C	) mi		0 mi		0 1				0 mi		0 mi	
			Freshw	ater Wetla	nd Ha	bitats Expos	ed (I	Miles o	ver Ecol	ogical Thresh	old)		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites <sup>7</sup> etland		nrub/Scrub and rested Wetland	
	C	) mi		0 mi		0 1	ni			0 mi		0 mi	
										onse Operatio			
Socioeconomic Impacts	evacuation populate the level affected heavily of real estate Schodaci be affect	ons and p d areas co of conce by oil, in oiled (abo e would k to Troy ed includ	recautio ould cau rn for so cluding t ut 11 mi be most . Additio e: OGS	nary clearar se effects or scioeconomi residue and iles). Rivers affected on onal impacts Mile 145; A	nce zor n commode effect odor. Stride part the we s may b	nes might cau nunities and l ets; shorefron SCAT operations, est shore from the experience	se fur busing t man ions beach Bet ed in ile 1	orther in nesses. rinas, b and cle thes, inc hlehem other to 44; PSI	mpacts to 17 miles leaches, peanup word dustry, co to Albar owns alor E&G Mil	vessel traffic. of shoreline wearks, and real ald be focused ommercial propay, and on the	Evac ould estate on a perty east s	be oiled above e would be reas more , and shorefront shore from intakes that may	

# Albany 155,000-bbl Bakken Crude Spill (Summer-Low Tide) Response

				Response Equipme	nt and Plan Activatio	n		
	NCP and		Tie	r Response Require	ments	G		Ss Activated lays)
	USCG Type	Tier 1 (24 hrs) Tier 2 (48 hrs)			Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/d 3,750 bbl s	300 per system lay	skimming system 3,750 bbl/day	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	1	n/a	10 river miles Mile 145-155 2016-6 to 2016-1
		I	Respons	se Overview: Expec	ted Outcomes and Cl	hallenge	es	
	Protective B	Sooming	Med	chanical Recovery	Shoreline Clear	nup	Othe	er Challenges
Spill Response	WCD skimming 1,875 bbl/ 3,750 bbl		rapid : reduce recove mobil: propel up sho boom	evaporation and spreading will e amount that can be ered mechanically; ize floating self-lled skimmers; set oreline containment areas with vacuumand skimmers.	About 1% is anticipate to cause shoreline contamination. Per SCAT; wetland flusome substrate rem due to penetration of sandy beaches; oiled structures; oiled de removal.	form shing; loval on ed dock	Bakken significa high ben area arou Potentia oil in hig areas; we may be of disturban during re cause eff for entra water co water into	nt danger, as are izene vapors in and the spill. If for submerged gh-sediment etland access challenge; nee of wetlands esponse may fects; potential inment of 31% in lumn leading to take and fish kill s; perform water tracking, and air

# Albany 155,000-bbl Bakken Crude Spill (Winter-High Tide) Effects

Scenario	Loca	tion	So	ource	1	/olume		Oil T	ype	Season		Tide Stage	
Description	Port of A	Albany		r loading nt (dock)	15:	5,000 bbl	В	akken	crude	Winter		High	
Spill		Annı	ıal Prob	ability Any	where	in Hudson	Rive	r		Historical Annual Frequency (2000-2015)			
Probability	Spi	ill of Typ	e (Any V	Volume)	S	pill of Type	and	Volum	e	US		Hudson	
		0.7	732			0.000	00013	5		0		0	
Conditions	Lat/l		Relea	se Rate	Release Date/Time		Model Run Duration			Winds		Water Temperature	
Conditions	42.61 -73.70			0 bbl/hr r 4 hrs	3 January 2015 3:00pm 30 days			ys	Light and variable (<5 k	cts)	33°F		
				Mass B	Balance at End of Model Ru				(After 30	Days)			
	Fate	Surf	face	Atmospl	here	Water Column	1	Se	diment	Ashore	e	Degraded	
	%	18.	0%	48.99	6	9.5%			1.1%	17.4%		5.1%	
SIMAP	bbl	27,923 75,791			14,764			1,656	26,970	)	7,897		
Modeling Results			Spatial Extent of			sure over Th	resh	old (U	p to 30 l	Days After Spi	ill)	•	
	Water (Volume) – Ecological			logical	Sur	face (Area x	Day	s Exp	osed)	Shore	eline	(Length)	
		Whole Oil Dissolved (1 mg/l) (0.001 mg/l)				cological 10 g/m²)	Socioeconomic (0.01 g/m²)			Ecologica (100 g/m <sup>2</sup>		Socioeconomic (1 g/m²)	
	178,056	mil gal	131,80	7 mil gal	292	mi <sup>2</sup> -days		45 mi <sup>2</sup> -		188 mi		208 mi	
			Shore	line Expos	ure by	Shore Type	(Mi	les ove	r Ecolog	gical Threshol	d)		
	Bedrock			Jnconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	Artificial Shore	
	18	18.6 mi			68 mi				(	54.3 mi		0 mi	
Faclarical		Bra	ckish/Es	stuarine W	etland Habitats Exposed (Miles			les over	Ecological Th	resh	old)		
Ecological Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	idal Lower Inte Mix				Phragmites Wetland		Shrub/Scrub and Forested Wetland	
Exposures	0	mi		0.3 mi		0.1	mi			0 mi	0 mi		
										logical Thresh			
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		nrub/Scrub and prested Wetland	
	3.	.5 mi		22.9 mi		6.3	mi			1.3 mi		0.2 mi	
										onse Operatio			
					_				_	hout river for a	_		
										o vessel trattic. es of shoreline v			
	populated areas could cause effects on communities and businesses. 208 miles of shoreline would be oiled above the level of concern for socioeconomic effects; shorefront marinas, beaches, parks, and real estate would be												
Socioeconomic	affected	by oil, in	cluding 1	esidue and	odor. S	SCAT operat	ions	and cle	anup wo	ould be focused	on a	reas more	
Impacts	_				_				-	_	_	y, and shorefront	
										and on the eas			
	Rensselaer to Livingston. Additional impacts may be experienced in other towns along the river. Water intakes that may be affected include: OGS Mile 145; AMRI Rensselaer Mile 144; PSE&G Mile 141; Bethlehem Mile												
	137; Cas	tleton Mi										or much or all of	
	the river	<u> </u>											

## Albany 155,000-bbl Bakken Crude Spill (Winter-High Tide) Response

				Response Equipme	nt and Plan Activati	on	_						
	NCP and		Tier	Response Require	nents	G		RSs Activated days)					
	USCG Type	Tier 1 (24 hrs)		Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail Miles		River Miles					
	Major WCD	25,000 ft boom 1,000 ft + 300 per skimming system 1,875 bbl/day 3,750 bbl storage		, I	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	n/a		35 river miles Mile 145-110 2016-6 to 2016-32					
	Response Overview: Expected Outcomes and Challenges												
	Protective B	Booming	Med	chanical Recovery	Shoreline Clea	anup	O	ther Challenges					
Spill Response	River currents 0.3 kts on flood kts on ebb, will boom effective containment an diversionary be configurations angled to preve entrainment an over; exclusion deflection confi to be used to pr sensitive areas. ice conditions of boom deployment	I and 0.8 I reduce ness, d oom to be ent d splash and igurations rotect Potential can impact	rapid s reduce recove mobili propel up sho boom trucks Potent may n	evaporation and spreading will e amount that can be ered mechanically; ize floating self-lled skimmers; set oreline containment areas with vacuumand skimmers. tial ice conditions egatively impact anical recovery tions	About 17% is anti to cause shoreline contamination. Pe SCAT; wetland fly some substrate rer due to penetration sandy beaches; oil structures; oiled d removal.	erform ushing; noval on led dock	Bakke signifi high the area a Poten oil in areas; be chat of well respon effects entrain water water conce	mability during a en spill is a icant danger, as are ben spill is a icant danger, as are benzene vapors in round the spill. tial for submerged high-sediment wetland access may allenge; disturbance tlands during nse may cause s; potential for nment of 10% in column leading to intake and fish kill rns; perform water un tracking, and air					

# Albany 155,000-bbl Bakken Crude Spill (Winter-Low Tide) Effects

Scenario	Loca	tion	So	ource	7	olume		Oil Ty	pe	Season		Tide Stage		
Description	Port of A	Albany		r loading nt (dock)	15:	5,000 bbl	В	akken c	crude	Winter		Low		
Spill		Annual Probability Anywhere in Hudson River									Historical Annual Frequency (2000-2015)			
Probability	Spi	ll of Typ	e (Any V	Volume)	S	pill of Type	and `	Volum	e	US		Hudson		
		0.7	732			0.000	00015	5		0		0		
Conditions	Lat/l			se Rate	Da	Release ate/Time	Model Run Duration			Winds		Water Temperature		
Conditions	42.61673 -73.7602			) bbl/hr 4 hrs		nuary 2015 D:00pm		30 day	ys	Light and variable (<5 k	ts)	33°F		
				Mass B	alance	at End of M	Iodel	Run (	After 30	Days)				
	Fate	Surf	ace	Atmospl	here	Water Column	l	Sec	diment	Ashor	e	Degraded		
	%	17.	7%	50.59	%	10.0%		(	0.5%	17.8%	, )	3.4%		
SIMAP Modeling	bbl	27,	508	78,34	8	15,555			710	27,54	7	5,331		
Modeling Results			Spatia	l Extent of	Expos	sure over Th	resh	old (U	p to 30 l	Days After Spi	ill)	·		
	Water (Volume) – Ec			logical	Sur	face (Area x	Day	s Expo	Exposed) Shore			eline (Length)		
				ssolved 01 mg/l)		cological 10 g/m²)	Socioeco (0.01			Ecologica (100 g/m²		Socioeconomic (1 g/m²)		
	198,378 mil g			8 mil gal		mi <sup>2</sup> -days		49 mi <sup>2</sup> -		186 mi		205 mi		
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)												
	Bedrock			Jnconsolida Rock	ated	Sand l	Beac	h	Mud	or Timber	A	Artificial Shore		
	18.3 mi			67.6 m	67.6 mi 2.1 mi					63.3 mi		0 mi		
Faclorical	Brackish/Estuarine Wetland Habitats Exposed (Miles over Ecological Threshold)													
Ecological Shoreline Exposures	Salt	marsh	U	pper Inter Mix	per Intertidal Mix		Lower Intertidal Mix			ragmites Vetland		Shrub/Scrub and Forested Wetland		
Exposures	(	) mi		0 mi		0.1 mi				0 mi		0 mi		
	Freshwater Wetland Habitats Exposed (Miles over Ecological Threshold)													
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites Vetland		hrub/Scrub and prested Wetland		
	3.	.9 mi		22.6 mi		6.3	mi			1.4 mi		0.4 mi		
										onse Operatio				
Socioeconomic Impacts	Response operations may cause major impacts to ports in Albany and throughout river for at least several days; evacuations and precautionary clearance zones might cause further impacts to vessel traffic. Evacuation of populated areas could cause effects on communities and businesses. 205 miles of shoreline would be oiled above the level of concern for socioeconomic effects; shorefront marinas, beaches, parks, and real estate would be affected by oil, including residue and odor. SCAT operations and cleanup would be focused on areas more heavily oiled (about 186 miles). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate would be most affected on the west shore from Albany to Saugerties, and on the east shore from Rensselaer to Clermont. Additional impacts may be experienced in other towns along the river. Water intakes that may be affected include: OGS Mile 145; AMRI Rensselaer Mile 144; PSE&G Mile 141; Bethlehem Mile 137; Castleton Mile 136. Additional precautionary fishing advisories would likely be instituted for much or all of the river.													

# Albany 155,000-bbl Bakken Crude Spill (Winter-Low Tide) Response

				Response Equipm	ent a	and Plan Activa	tion						
	NCP and		Tier Response Requirements						Ss Activated ays)				
	USCG Type	Tier 1 (24 hrs)		Tier 2 (48 hrs) T		ier 3 (72 hrs)	Rail Miles		River Miles				
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/c 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage		n/a		40 river miles Mile 145-105 2016-6-2016-36				
	Response Overview: Expected Outcomes and Challenges												
	Protective B	Sooming	M	echanical Recovery		Shoreline (	Cleanup	Ot	Other Challenges				
Spill Response	River currents 0.3 kts on flood	I and 0.8 reduce ness, d com to be nt d splash and igurations rotect Potential can impact	spread that ca mecha floatin skimn contai vacuu skimn Potent negati	tial ice conditions ma vely impact unical recovery	unt e vith	About 17% is a to cause shorel contamination. SCAT; wetland some substrate due to penetrat sandy beaches; structures; oile removal.	ine Perform I flushing; removal ion on oiled dock	Bakke signifi high b area an Potent oil in l areas; may b disturb during cause of for ent water of	nability during a n spill is a cant danger, as are enzene vapors in round the spill. ial for submerged nigh-sediment wetland access e challenge; bance of wetlands response may effects; potential trainment of 10% in column leading to intake and fish kill rns; perform water in tracking, and air oring.				

### Albany 155,000-bbl Bakken Crude Spill with Fire/Explosion

Scenario	Location	Sour		Volume	Oi	il Type	Seas	on	Tide
Description	Port of Albany	Tanker laccident		155,000 bbl	Bakk	cen crude	Summe		High
Spill		Aı	nual P		Histori	cal Annua (2000-2	al Frequency 015)		
Probability <b>Probability</b>	Spill of Type	e in Huds	on	Spill Volum	e in Hı	udson	US	5	Hudson
·	0.732			0.000		0		0	
Conditions	Lat/Lon	Release	Rate	Release Date/Time	Run	Duration	Winds		Temperature
Conditions	42.61673 -73.76020	38,750 over 4		2 August 2015 1:30pm	30	0 days	South / (<10 k	cts)	77°F
Fire/Explosion	Pool Fir	~		Pool Fire		Vapor (			Cloud Explosion
Probabilities	Probability/In	cident		Probability		Explosion/			robability
	0.08			0.00000012		0.02			.00000004
	Emergency			Evacuati				alth/Safe	
	This event may hand a spill on the simultaneously.		measure, isolate s	te precautionary e spill or leak area neters (150 feet) in  Inhalation or contact with materia irritate or burn skin and eyes.  Fire may produce irritating, corro				nd eyes.	
	Specific incident to be made early attack fire or allo	as to when	ther to	Large Spill • Consider initial evacuation for at	vind	and/or toxic gases.  Vapors may cause dizziness or suffocation.			
	Port of Albany has firefighting vesses a 1,500 gpm water unit may be insured.	el, <i>Marine</i> er monitor	. This	(1000 feet).  Fire • ISOLATE for 80		Light, sweet crude oils will normally contain lighter flammable gasses such as butane and propane (unless these			
Fire/Explosion Response <sup>8</sup>	potential size of			mile) in all directi consider initial ev	lso,	gases have been removed). These flammable gasses can readily ignite if			
Response	Kingston, Albany FD have NYS su trailers w/monito	pplied foa rs for rail	m crude	meters (1/2 mile)		released, when they come in contact with an ignition source. These crude oils may also contain hydrogen sulfide,			
	oil derailment fir and foam quantit insufficient for th spill/fire.	y would b	e			a toxic inhalation hazard material. Due to the characteristics of crude oil, in an accident scenario, the behavior of this product may range from that of gasoline			
	RP would be req implement and n Firefighting cont	nobilize V		for the lighter diesel fuel for oils.					crude oils to vier (sour) crude
	in order to provide foam and equipment to a potential large	de manpov nent to res	ver, pond			Air monitoring should be performed for responder and public safety.			
	Flammable			In	npacts	from Fire	(Acres)		
	Distance	Tot	tal	Residential	C	Commercial	Indu	strial	Public Use
G 6 . T	581 feet	0.3 a	acre	0.1 acre		0.1 acre	0 ac	cres	0.1 acre
Safety Impacts	Downwind	_		Impa	ects fro	om Explosi	on (Acres)		
	Distance	Total		Residential		commercial		strial	Public Use
	1.66 miles	476 a	cres	305 acres		47 acres	124 :	acres	0 acres
			-						

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<sup>&</sup>lt;sup>8</sup> If concurrent with a spill to the water, see also spill response tables. If there is a fire and/or explosion, some or even most of the oil may be consumed by the fire, reducing the amount of oil that would spill into the river and affect shorelines. In most cases, it would be necessary to conduct at least some oil spill cleanup in addition to fire-fighting, though those operations would be secondary to emergency fire-fighting operations.

<sup>32</sup> Hudson River Oil Spill Risk Assessment Volume 7: Spill Scenario Summaries

## Coxsackie 25,000-bbl Home Heating Oil Spill

## Coxsackie 25,000-bbl Home Heating Oil Spill (Spring-High Tide) Effects

Scenario	nario Location			ource	7	<b>Volume</b>		Oil Ty	_	Season		Tide Stage	
Description	Coxsa	ackie		grounding ollision	25	5,000 bbl	Н	ome he	_	Spring		High	
Spill		Annı	ıal Prob	ability Any	where	in Hudson	Rive	r		Historical Annual Frequency (2000-2015)			
Probability	Spill of Type (Any Volume)				Spill of Type and Volume				e	US		Hudson	
·		0.7	732			0.0	012			0		0	
Conditions	Lat/l	Lon	Relea	ase Rate	Da	Release nte/Time	Model Run Duration			Winds		Water Temperature	
Conditions	42.35 -73.78		Inst	antaneous		pril 2016 3:00am		30 da	ıys	SW / moder (5-20 kts)		46°F	
	Mass Balance at End of Model Run (After 30 Days)												
	Fate	Surf	ace	Atmosph	nere	Water Column		Se	diment	Ashor	e	Degraded	
	%	0.0	%	44.5%	Ď	32.2%		(	0.8%	4.9%		17.6%	
SIMAP Modeling	bbl	1	1	11,11:	5	8,046			201	1,232		4,395	
Results			Spatia	l Extent of	Expo	sure over Th	resh	old (U	p to 30 E	ays After Spi	ill)		
		r (Volum	e) – Eco	ological	Sur	Surface (Area x Days Exposed)				Shore	eline	(Length)	
				ssolved 01 mg/l)	(	cological 10 g/m²)	Socioeconomic (0.01 g/m²)		g/m <sup>2</sup> )	Ecologica (100 g/m <sup>2</sup>		Socioeconomic (1 g/m²)	
	148,283	mil gal	217,82	21 mil gal	mi <sup>2</sup> -days		13 mi <sup>2</sup> -	days	88 mi		175 mi		
						Shore Type	(Mi	les ove	r Ecolog	ical Threshol	d)		
	Bedrock			Jnconsolida Rock	Sand I	Sand Beach			or Timber	A	Artificial Shore		
	14.6 mi			46.7 mi						15.9 mi		0 mi	
Ecological		Bra								Ecological Th			
Shoreline	Salt	marsh	U	Upper Intertidal Mix		Lower Intertidal Mix		Phragmites Wetland		Shrub/Scrub and Forested Wetland			
Exposures	0 m	i		0 mi		0.1 mi				0 mi	0 mi		
	Freshwater Wetland Habitats Exposed (Miles over Ecological Threshold)												
	Catta	il Marsh	U	Upper Intertidal Mix		Lower In		idal		ragmites /etland		hrub/Scrub and prested Wetland	
	0.2	2 mi		6 mi		2.7	mi		(	0.5 mi		0.1 mi	
		Potential Socioeconomic Impacts from Spill and Response Operations											
Socioeconomic Impacts	175 mile beaches, would be commerce Lloyd, and towns also Mile 92;	Response operations may cause major impacts to ports in Albany and throughout river for at least several days. 175 miles of shoreline would be oiled above the level of concern for socioeconomic effects; shorefront marinas, beaches, parks, and real estate would be affected by oil, including residue and odor. SCAT operations and cleanup would be focused on areas more heavily oiled (about 88 miles). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate would be most affected on the west shore from Coxsackie to Lloyd, and on the east shore from Stuyvesant to Hyde Park. Additional impacts may be experienced in other towns along the river. Water intakes that may be affected include: Ulster Mile 96; Rondout Mile 92; Rhinebeck Mile 92; Port Ewen Mile 89; Hyde Park Mile 80; Poughkeepsie Mile 77; Highland Mile 76; IBM Mile 72. Additional precautionary fishing advisories would likely be instituted for much or all of the river.										efront marinas, tions and cleanup es, industry, coxsackie to ced in other 92; Rhinebeck I Mile 72.	

# Coxsackie 25,000-bbl Home Heating Oil Spill (Spring-High Tide) Response

			]	Response Equipme	nt and Plan Activati	on			
	NCP and		Tier	Response Require	GRPs/ GRSs Activated (7 days)				
	USCG Type	Tier 1 (24 hrs)		Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles	
	Major MMPD- WCD	25,000 ft boom 1,000 ft + 300 per skimming system 1,875 bbl/day 3,750 bbl storage		25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	n,	/a	48 river miles Mile 123-75 2016-22 to 2016-58	
		J	Respons	se Overview: Expec	ted Outcomes and O	Challenge	s		
	Protective B	Booming	Med	chanical Recovery	Shoreline Cle	anup	Other Challenges		
Spill Response	An average cur velocity of 1.1 in high currents reduce boom effectiveness, containment an diversionary be configurations angled to preve entrainment and over; exclusion deflection conf to be used to pr sensitive areas.	d com to be ent d splash and igurations rotect	rapid s reduce recove mobili propel up sho boom	evaporation and spreading will e amount that can be ered mechanically; ize floating self-lled skimmers; set oreline containment areas with vacuumand skimmers.	About 5% is antice to cause shoreline contamination. Per SCAT; wetland fl some substrate reduct to penetration sandy beaches; oil structures; oiled design removal.	erform ushing; moval on led dock	oil in hi areas; w may be disturba during r cause ef for entra water co water in concern	Il for submerged gh-sediment retland access challenge; nce of wetlands esponse may fects; potential ainment of 32% in olumn leading to take and fish kill s; perform water tracking.	

# Coxsackie 25,000-bbl Home Heating Oil Spill (Spring-Low Tide) Effects

Scenario	Loca	ation		ırce	,	Volume		Oil Ty	pe		Season		Tide Stage	
Description	Coxs	ackie	Tanker g or col	rounding lision	2:	5,000 bbl	Ho	me heat	ing oil		Spring		Low	
Spill		Annual Probability Anywhere in Hudson River  Historical Annual Frequency (2000-2015)												
Probability	Sp	ill of Typ	e (Any V	olume)	$\mathbf{S}_{\mathbf{I}}$	Spill of Type and Volume					US		Hudson	
	0.732					0.0	0.012				0		0	
Conditions	Lat/		Releas	se Rate	D	Release Date/Time		Model Run Duration			Winds		Water Temperature	
Conditions		5119 78982	Instan	taneous		April 2016 1:00am		30 day	/S		/ modera 5-20 kts)	ite	46°F	
				Mass B	Salance	e at End of M	odel 1	Run (A	fter 30 I	Days)				
	Fate	Sur	face	Atmosp	here	Water Colu	mn	Se	diment		Ashore	e	Degraded	
	%	0.1	1%	46.	3%	28.1%			0.8%		6.3%		18.5%	
SIMAP	bbl	21		11,	563	7,025			191		1,564		4,636	
Modeling Results			Spatia	Extent of	f Expo	sure over Th	resho	ld (Up	to 30 Da	ys Af	ter Spill)			
Results	Water (Volume) – Ecological				St	ırface (Area x	k Day	s Expo	sed)	Shoreline (Length)				
						Cological (10 g/m²)					l )	Socioeconomic (1 g/m²)		
	136,030			5 mil gal		mi <sup>2</sup> -days	1	7 mi <sup>2</sup> -c			107 mi		202 mi	
	Shoreline Exposure by Shore Type (Miles over Ecological Threshold)													
	Bedrock			nconsolid: Rock	Sand Reach			l	Mud	or Ti	mber	A	rtificial Shore	
	17.5 mi			57.3 m	ni	1.4	1.4 mi			18.5 mi			0 mi	
Englacian		Bra	ckish/Es	tuarine W	etland	l Habitats Ex	posed	(Miles	over Ec	cologi	cal Thres	shol	d)	
Ecological Shoreline Exposures	Sal	tmarsh	Uı	Upper Intertidal Mix		Lower Intertidal Mix			Phragmites Wetland			Shrub/Scrub and Forested Wetland		
Laposures	0.1 mi			0.2 m	i	0.1	mi			0.6 mi			0 mi	
	Freshwater Wetland Habitats Exposed (Miles over Ecological Threshold)													
	Catta	ail Marsh	Ul	per Inter Mix	tidal	Lower Inte	rtida	l Mix		ragmi Vetlan			rub/Scrub and rested Wetland	
		0.6 mi		8.1 m	i	2.2	mi			0.5 n	ni		0.1 mi	
						ic Impacts fr								
	Response operations may cause major impacts to ports in Albany and throughout river for at least several days.													
	202 miles of shoreline would be oiled above the level of concern for socioeconomic effects; shorefront marinas,													
Socioeconomic	beaches, parks, and real estate would be affected by oil, including residue and odor. SCAT operations and cleanup would be focused on areas more heavily oiled (about 107 miles). Riverside parks, marinas, beaches, industry,													
Impacts			•			ate would be a								
													d in other towns	
						fected include ghkeepsie Mi							ebeck Mile 92;	
						y be instituted						2. P	additional	
	I	j,-1	610			,								

# Coxsackie 25,000-bbl Home Heating Oil Spill (Spring-Low Tide) Response

				Response Equipme	ent	and Plan Activat	tion						
	NCP and		Tier	Response Require	GRPs/ GRSs Activated (7 days)								
	USCG Type	Tier 1 (24 hrs)		Tier 2 (48 hrs)	r	<b>Fier 3 (72 hrs)</b>	Rail Mi	les	River Miles				
	Major MMPD- WCD	25,000 ft boom 1,000 ft + 300 per skimming system 1,875 bbl/day 3,750 bbl storage		25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	1,0 sk 7,5	,000 ft boom 000 ft + 300 per imming system 500 bbl/day ,000 bbl storage	n/a		45 river miles Mile 123-78 2016-22 to 2016-56				
	Response Overview: Expected Outcomes and Challenges												
C W D	Protective 1	Booming	Me	echanical Recovery	Shoreline C	leanup	Ot	Other Challenges					
Spill Response	An average curvelocity of 1.1 in high current reduce boom effectiveness, and diversional configurations angled to preventrainment an over; exclusion deflection configuration be used to psensitive areas	rrent kts results s that will containment ry boom to be ent d splash and figurations rotect	46% rapid reduction recover mobility properties to boom	evaporation and I spreading will ce amount that can be vered mechanically; lize floating self- elled skimmers; set noreline containment in areas with vacuum is and skimmers.	e t	About 6% is ant cause shoreline contamination. I SCAT; wetland some substrate r to penetration or beaches; oiled d structures; oiled removal.	Perform flushing; emoval due a sandy ock	pated to  Potential for subme oil in high-sediment areas; wetland accession may be challenge; disturbance of wetlater during response mater k  Potential for subme oil in high-sediment areas; wetland accession may be challenge; disturbance of wetlater during response mater during response material for subme oil in high-sediment areas; wetland accession may be challenged.					

# Coxsackie 25,000-bbl Home Heating Oil Spill (Summer-High Tide) Effects

Scenario	Loca	tion	So	ource	7	olume		Oil Type	Ī	Season		Tide Stage
Description	Coxsa	ackie	Tanker or co	grounding ollision	25	,000 bbl	Н	ome heating oil		Summer		High
Spill		Annı	ual Prob	ability Any	where	in Hudson	Rive	er				ual Frequency 2015)
Probability	Spi	ill of Typ	e (Any '	Volume)	S	pill of Type	and `	Volume		US		Hudson
		0.7	732			0.0	)12			0		0
Conditions	Lat/l		Relea	ase Rate	Da	Release ite/Time		Model Run Duration		Winds		Water Temperature
Conditions	42.35 -73.78		Instant	aneous	2	1gust 2016 2:00am		30 days		ight / variab (<5 kts)	le	77°F
				Mass B	alance		<b>Iode</b>	l Run (After 3	30 D	ays)		_
	Fate	Sur	face	Atmospl	here	Water Column	1	Sediment	;	Ashore	<u> </u>	Degraded
	%	0.0	%	70.3%	Ď	7.4%		0.3%		18.6%		3.4%
SIMAP Modeling	bbl	0	)	17,574	4	1,858		70		4,638 860		
Results		Spatial Extent of Exposure over Threshold (Up to 30 Days After Spill)										
		Water (Volume) - Ecological Surface (Area x Days Exposed) Shoreline (Length)										_
	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$									_		
	32,178	mil gal	41,82	0 mil gal	41	mi <sup>2</sup> -days	4	48 mi <sup>2</sup> -days		70 mi		100 mi
						Shore Type	(Mi	iles over Ecolo	ogica	l Threshold	<b>l</b> )	
	Bee	drock	τ	Jnconsolida Rock	ated	Sand I	Beac	h Mu	d or	Timber	A	artificial Shore
	1.	6 mi		16.6 mi		0 1	mi		42.8	3 mi		0 mi
Ecological		Bra						ed (Miles over				
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower II			_	mites land		nrub/Scrub and prested Wetland
Exposures	(	) mi		0 mi		0.1	mi		0	mi		0 mi
								Miles over Ec				
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower II				mites land		nrub/Scrub and prested Wetland
	1 mi 3.2 mi 3.1 mi 1.4 mi 0.1 mi								0.1 mi			
								Spill and Res				
Socioeconomic Impacts	Response operations may cause major impacts to ports in Albany and throughout river for at least several days. 100 miles of shoreline would be oiled above the level of concern for socioeconomic effects; shorefront marinas, beaches, parks, and real estate would be affected by oil, including residue and odor. SCAT operations and cleanup would be focused on areas more heavily oiled (about 70 miles). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate would be most affected on the west shore from Coxsackie to Bethlehem, and on the east shore from Stuyvesant to Schodack. Additional impacts may be experienced in other towns along the river. Water intakes that may be affected include: PSE&G Mile 141; Bethlehem Mile 137; Castleton Mile 136. Additional precautionary fishing advisories would likely be instituted for much or all of the river.											

# Coxsackie 25,000-bbl Home Heating Oil Spill (Summer-High Tide) Response

			R	esponse Equipment	t and Plan Activatio	n		
	NCP and		Tier	Response Requirer	nents	G		Ss Activated lays)
	USCG Type	Tier 1 (	24 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major MMPD-WCD	25,000 ft 1,000 ft + skimming 1,875 bbl 3,750 bbl	300 per g system day	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	1	n/a	15 river miles Mile 123-138 2016-22 to 2016-12
		]	Response	Overview: Expecte	ed Outcomes and Cl	hallenge	s	
	Protective Bo	oming	Mech	anical Recovery	Shoreline Clean	nup	Othe	er Challenges
Spill Response	An average curre velocity of 1.1 k in high currents reduce boom effectiveness, containment and diversionary boo configurations to angled to preven entrainment and over; exclusion a deflection configuration to be used to prosensitive areas.	om  b be t splash and gurations	rapid sp reduce a recovery mobiliz propelle up short boom as	aporation and preading will amount that can be end mechanically; e floating self-end skimmers; set eline containment reas with vacuum-nd skimmers.	About 19% is antic to cause shoreline contamination. Perf SCAT; wetland flus some substrate rem due to penetration of sandy beaches; oiled structures; oiled del removal.	form shing; oval on d dock	oil in hig areas; we be challed of wetland responsed effects; pentrainment water converts water into concerns areas near prior to constant	for submerged th-sediment etland access may enge; disturbance ands during may cause cotential for tent of 7% in lumn leading to take and fish kill the especially in the spill site dilution; perform lumn tracking.

### Coxsackie 25,000-bbl Home Heating Oil Spill (Summer-Low Tide) Effects

	Loca	tion	Sc	ource	7	olume		Oil Typ	ne .	Season		Tide Stage
Scenario Description	Coxsa		Tanker	grounding ollision		,000 bbl	Н	ome hea		Summer		Low
		Annı			where	in Hudson	Rive					ual Frequency 2015)
Spill Probability	Spi	ill of Typ	e (Anv '	Volume)	S	pill of Type	and '	Volume		US	1000-	Hudson
Trobability	~ F		732		~ !	• • •	)12			0		0
Conditions	Lat/I			ase Rate		Release nte/Time		Model R Duratio		Winds		Water Temperature
Conditions	42.35 -73.78		Insta	ntaneous		August 6 6:30am		30 day	s	Light / variab (<5 kts)	le	77°F
				Mass B	alance	at End of M	Iode	l Run (A	After 30	Days)		_
	Fate	Sur	face	Atmospl	nere	Water Column	l	Sed	iment	Ashore	e	Degraded
	%	0.0	)%	70.1%	ó	6.8%		0.	.3%	19.4%		3.4%
SIMAP Modeling	bbl									4,846		856
Results		Spatial Extent of Exposure over Threshold (Up to 30 Days After Spill)										
	Water	Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (Length)										
		$ \begin{array}{c ccccc} Whole \ Oil & Dissolved & Ecological & Socioeconomic & Ecological & Socioeconomic \\ (1 \ mg/l) & (0.001 \ mg/l) & (10 \ g/m^2) & (0.01 \ g/m^2) & (100 \ g/m^2) & (1 \ g/m^2) \\ \end{array} $										Socioeconomic (1 g/m²)
	27,011	mil gal	37,38	88 mil gal	38	mi <sup>2</sup> -days	2	45 mi <sup>2</sup> -d	ays	69 mi		95 mi
						Shore Type	(Mi	iles over	Ecolog	ical Threshol	d)	
	Bee	drock	J	Jnconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	artificial Shore
	1.	6 mi		17.5 mi		0 1	ni		4	2.2 mi		0 mi
Ecological		Bra								Ecological Th		
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Tetland		nrub/Scrub and prested Wetland
Emposures	C	) mi		0.3 mi		0.1	mi			0 mi		0 mi
										ogical Thresh		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites /etland		nrub/Scrub and prested Wetland
	0.9 mi 2.4 mi 2.3 mi 1.3 mi 0.1 mi									0.1 mi		
	Potential Socioeconomic Impacts from Spill and Response Operations  Response operations may cause major impacts to ports in Albany and throughout river for at least several days. 95											
Socioeconomic Impacts	miles of beaches, would be commerce Bethlehe towns alo Mile 141	shoreline parks, are focused cial prope em, and o ong the ri	would be would be would real eston areas or the east tyer. Water Mile	be oiled about a state would as more heaver shore from the state of the shore from	ve the be affe ily oile real est Stuyvhat ma	level of conc cted by oil, i ed (about 69 a ate would be resant to Ren y be affected	ern f nclud miles mos ssela incl	for socio- ding resi- s). Rivers at affecte her. Addi ude: OG	econom due and side parl d on the itional in S Mile	odor. SCAT of odor. SCAT of ks, marinas, be west shore from pacts may be 145; Rensselae	refron opera eache om C e expe er Mi	nt marinas, tions and cleanup es, industry,

# Coxsackie 25,000-bbl Home Heating Oil Spill (Summer-Low Tide) Response

			R	esponse Equipmen	t and Plan Activatio	n		
	NCP and		Tier	Response Require	nents	G		Ss Activated ays)
	USCG Type	Tier 1 (2	24 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major MMPD-WCD	25,000 ft 1,000 ft + skimming 1,875 bbl 3,750 bbl	300 per g system /day	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	1	n/a	22 river miles Mile 123-145 2016-22 to 2016-6
		l	Response Overview: Expected Outcomes and			hallenge	s	
	Protective Bo	oming	Mech	anical Recovery	Shoreline Clear	nup	Othe	er Challenges
Spill Response	An average curre velocity of 1.1 ki in high currents or reduce boom effectiveness, containment and diversionary boo configurations to angled to preven entrainment and over; exclusion a deflection configuration to be used to prosensitive areas.	em  be  be  that will  be  that  splash  and  gurations	rapid spreduce a recover mobilized propelled up short boom a	aporation and preading will amount that can be ed mechanically; e floating selfed skimmers; set eline containment reas with vacuum- and skimmers.	About 19% is antic to cause shoreline contamination. Per SCAT; wetland flusome substrate rem due to penetration of sandy beaches; oiled structures; oiled de removal.	form shing; oval on ed dock	oil in hig areas; we be challe of wetlar response effects; pentrainm water co- water int concerns spill site	threstiment etland access may enge; disturbance ands during may cause potential for lumn leading to ake and fish kill especially near prior to dilution; water column

### Coxsackie 25,000-bbl Home Heating Oil Spill (Winter-High Tide) Effects

	Loca	tion	Sc	ource	7	olume		Oil Type	e	Season		Tide Stage	
Scenario Description	Coxsa		Tanker	grounding ollision		,000 bbl		ome heat		Winter		High	
~		Annı	ı		where	in Hudson	Rive					ual Frequency 2015)	
Spill Probability	Spi	ill of Typ	e (Any '	Volume)	S	pill of Type :	and `	Volume		US		Hudson	
Trobublicy		• • •	732	,		0.0	)12			0		0	
Conditions	Lat/l	Lon	Relea	ase Rate	Da	Release ate/Time		Model Ru Duration	n	Winds		Water Temperature	
Conditions	42.3 -73.78	85119 8982	Insta	ntaneous		nuary 2016 3:00am		30 days		Light / variab (<5 kts)	ole	32°F	
				Mass B	alance	at End of M	Iode	l Run (A	fter 30 l	Days)			
	Fate	Surf	ace	Atmosph	nere	Water Column		Sedi	ment	Ashore	•	Degraded	
	%	0.0	1%	66.3%	ò	0.9%		0.3	3%	30.2%		2.4%	
SIMAP Modeling	bbl	C	)	16,56	4	217		6	9	7,550 599			
Results		Spatial Extent of Exposure over Threshold (Up to 30 Days After Spill)											
		Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (Length)										` 0 /	
												Socioeconomic (1 g/m²)	
	869 m			55 mil gal		mi <sup>2</sup> -days		66 mi <sup>2</sup> -da		99 mi	,	117 mi	
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)											
	Bee	drock	Ţ	Jnconsolida Rock	ated	Sand 1	Beac	h	Mud o	r Timber	A	Artificial Shore	
	12	2.5 mi		38.5 mi		1.1	mi		27	.8 mi		0 mi	
Factoriant		Bra	ckish/E	stuarine W	etland	Habitats Ex	<b>xpose</b>	ed (Miles	over E	cological Thi	resho	old)	
Ecological Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower II		idal		igmites tland		nrub/Scrub and prested Wetland	
Laposures	C	) mi		0 mi		0.1	mi		C	) mi		0 mi	
										gical Thresh			
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower II		idal		igmites etland		nrub/Scrub and prested Wetland	
	1.4 mi 12.9 mi 4.1 mi 0.3 mi 0.1 mi												
			Poten	tial Socioed	conom	ic Impacts fi	rom	Spill and	l Respor	se Operation	ns		
Socioeconomic Impacts	117 mile beaches, would be commerce	es of shor parks, ar e focused cial prope	eline wo nd real es on areas erty, and	uld be oiled state would s more heav shorefront	above be affe ily oile real est	the level of cted by oil, it does not be the cted by oil, it does not be the cted by the cted be the cted by the c	conco nclud miles mos	ern for so ding resid s). Riversi at affected	ocioecon lue and o ide park l on the	omic effects; odor. SCAT of s, marinas, be west shore fro	shor pera eache om C	Coxsackie to	
	Kingston, and on the east shore from Stuyvesant to Rhinebeck. Additional impacts may be experienced in other towns along the river. Water intakes that may be affected include: Ulster Mile 96; Rondout Mile 92; Rhinebeck Mile 92. Additional precautionary fishing advisories would likely be instituted for much or all of the river.									92; Rhinebeck			

# Coxsackie 25,000-bbl Home Heating Oil Spill (Winter-High Tide) Response

			R	esponse Equipment	t and Plan Activation	n		
	NCP and			Response Requirer				s Activated ays)
	USCG Type	Tier 1 (	24 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major MMPD-WCD	25,000 ft 1,000 ft + skimming 1,875 bbl 3,750 bbl	300 per g system day	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	1	n/a	30 river miles Mile 123-93 2016-22 to 2016-45
					ed Outcomes and Cl	nallenge	s	
	Protective Bo	oming	Mech	anical Recovery	Shoreline Clear	nup	Othe	r Challenges
Spill Response	An average curre velocity of 1.1 kg in high currents or reduce boom effectiveness, containment and diversionary book configurations to angled to preven entrainment and over; exclusion a deflection configuration to be used to prosensitive areas. Potential ice con may affect boom deployment.	ent ts results that will on o be t splash and gurations tect ditions	66% everapid spreduce a recovered mobilized propelle up shore boom an trucks a Potentia may affer	aporation and preading will amount that can be ed mechanically; e floating self-ed skimmers; set eline containment reas with vacuum-nd skimmers.  All ice conditions ect mechanical y operations.	About 30% is anticito cause shoreline contamination. Perf SCAT; wetland flus some substrate remedue to penetration of sandy beaches; oiled structures; oiled det removal.	form shing; oval on d dock	Potential oil in hig areas; we be challe of wetlar response effects; pentrainm water copotential intake an especiall the spill in the s	for submerged h-sediment etland access may nge; disturbance ds during may cause ootential for ent of 1% in lumn leading to negative water d fish concerns y in areas near site prior to perform water

### Coxsackie 25,000-bbl Home Heating Oil Spill (Winter-Low Tide) Effects

Scenario	Loca	tion		ource	1	olume		Oil Type		Season		Tide Stage
Description	Coxsa	ackie		grounding ollision	25	,000 bbl	Н	ome heating oil	;	Winter		Low
Spill		Annı	ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Probability	Spi	ill of Typ	e (Any '	Volume)	$\mathbf{S}_{1}$	pill of Type a	and '	Volume		US		Hudson
		0.7	732			0.0	)12			0		0
Conditions	Lat/		Relea	ase Rate	Da	Release te/Time		Model Run Duration		Winds		Water Temperature
Conditions	42.35 -73.78		Insta	ntaneous		nuary 2016 9:00am		30 days		Light / variab (<5 kts)		32°F
				Mass B	alance	at End of M	<b>Iode</b>	l Run (Afte	r 30 I	Days)		_
	Fate	Surf	face	Atmosph	nere	Water Column	l	Sedime	nt	Ashore	)	Degraded
	%	0.0	)%	66.2%	ò	0.6%		0.3%		30.6%		2.3%
SIMAP Modeling	bbl	2	<u></u>	16,54	4	147		64		7,661		582
Results		Spatial Extent of Exposure over Threshold (Up to 30 Days After Spill)										
		Water (Volume) - Ecological Surface (Area x Days Exposed) Shoreline (Length)										, 0 ,
		le Oil ng/I)		ssolved		cological 10 g/m²)		ocioeconom (0.01 g/m²)	ic	Ecological (100 g/m²)		Socioeconomic (1 g/m²)
	(1 mg/l) (0.001 mg/l) 1,322 mil gal 62,096 mil gal				mi <sup>2</sup> -days		54 mi <sup>2</sup> -days		92 mi	,	106 mi	
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)										
	Bee	drock	Ţ	Jnconsolida Rock	ated	Sand 1	Beac	h N	lud or	Timber	A	artificial Shore
	8.	.1 mi		34.5 mi		0.6	mi		30.	9 mi		0 mi
Ecological		Bra				Habitats Ex	_		er Ed	ological Th	resho	old)
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		gmites tland		nrub/Scrub and rested Wetland
Laposures	C	) mi		0 mi		0.1	mi		0	mi		0 mi
						bitats Expos				-		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		gmites tland		rub/Scrub and rested Wetland
									0.3 mi			
			Poten	tial Socioed	conom	ic Impacts fi	rom	Spill and R	espon	se Operatio	ns	
Socioeconomic Impacts	106 mile beaches, would be commerce Ulster, a	es of short parks, ar e focused cial prope nd on the	eline wo nd real es on areas erty, and e east sho	uld be oiled state would s more heav shorefront	above be affe ily oile real est yvesar	the level of octed by oil, is d (about 92 at the would be at to Red Hoo	conce nclud miles mos ok. A	ern for socion ding residue s). Riverside st affected of dditional in	and o parks the vapacts	omic effects; dor. SCAT of , marinas, be west shore from ay be expe	shore pera- eache om C erienc	oxsackie to ed in other
	towns along the river. Water intakes that may be affected include: Ulster Mile 96; Rondout Mile 92; Rhinebec Mile 92. Additional precautionary fishing advisories would likely be instituted for much or all of the river.											

# Coxsackie 25,000-bbl Home Heating Oil Spill (Winter-Low Tide) Response

			R	esponse Equipmen	t and Plan Activatio	n		
	NCP and			Response Require				s Activated ays)
	USCG Type	Tier 1 (2	24 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major MMPD-WCD	25,000 ft l 1,000 ft + skimming 1,875 bbl/ 3,750 bbl	300 per system day	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	1	n/a	28 river miles Mile 123-95 2016-22 to 2016-44
		I	Response		ed Outcomes and Cl	hallenge	s	
	Protective Bo	oming	Mech	anical Recovery	Shoreline Clear	nup	Othe	r Challenges
Spill Response	An average curre velocity of 1.1 km in high currents of reduce boom effectiveness, containment and diversionary book configurations to angled to preven entrainment and over; exclusion a deflection configuration to be used to prosensitive areas. Potential ice con may affect boom deployment.	ent ts results that will om o be t splash und gurations tect ditions	66% ev rapid sp reduce a recover mobiliz propelle up shor boom a trucks a	aporation and breading will amount that can be ed mechanically; e floating selfed skimmers; set eline containment reas with vacuumind skimmers.  al ice conditions ect mechanical y operations.	About 31% is antic to cause shoreline contamination. Perf SCAT; wetland flus some substrate rem due to penetration of sandy beaches; oile structures; oiled del removal.	form shing; oval on d dock	Potential oil in hig areas; we be challe of wetlar response effects; pentrainm water copotential intake an especiall the spill in the s	for submerged h-sediment etland access may nge; disturbance ads during may cause otential for ent of 1% in lumn leading to negative water d fish concerns y in areas near site prior to perform water

### Proposed Kingston Anchorage 150,000-bbl Home Heating Oil Spill

Kingston 150,000-bbl Home Heating Oil Spill (Spring-High Tide) Effects

	Loca	tion	So	ource	7	olume		Oil Typ	e	Season		Tide Stage	
Scenario Description	Propo King Ancho	ston	ATB	collision	150	0,000 bbl		ome heat		Spring		High	
Cm:II			ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)	
Spill Probability	Spi	ill of Typ	e (Any V	Volume)	$\mathbf{S}_{\mathbf{I}}$	pill of Type	and \	Volume		US		Hudson	
·		0.7	732			0.000	00015	5		0		0	
Conditions	Lat/	Lon	Relea	ase Rate	Da	Release nte/Time		Model Ru Duratio		Winds		Water Temperature	
Conditions	41.93 -73.93			00 bbl/hr er 4 hrs		pril 2016 3:00am		30 days	s	South / mode (2-15 kts)		48°F	
				Mass B	alance	at End of M	Iodel	Run (A	fter 30	Days)			
	Fate	Surf	face	Atmospl	here	Water Column	ì	Sedi	ment	Ashore	e	Degraded	
	%	1.0	)%	51.9%	ó	25.7%		0.8	8%	1.5%		19.1%	
SIMAP Modeling	<b>bbl</b> 1,430 77,827 38,538 1,187									2,301		28,717	
Results		Spatial Extent of Exposure over Threshold (Up to 30 Days After Spill)											
		Water (Volume) - Ecological Surface (Area x Days Exposed) Shoreline (Length)											
		$ \begin{array}{c ccccc} Whole \ Oil & Dissolved & Ecological & Socioeconomic & Ecological & Socioeconomic \\ (1 \ mg/l) & (0.001 \ mg/l) & (10 \ g/m^2) & (0.01 \ g/m^2) & (100 \ g/m^2) & (1 \ g/m^2) \\ \end{array} $											
	592,012	mil gal	566,34	40 mil gal	60	mi <sup>2</sup> -days	6	5 mi <sup>2</sup> -da	nys	110 mi		208 mi	
						Shore Type	e (Mi	les over	Ecolog	ical Threshol	d)		
	Be	drock	Ţ	Jnconsolida Rock	ated	Sand	Beac	h	Mud	or Timber	A	Artificial Shore	
	19	.6 mi		74.6 mi		0.1	mi		,	7.7 mi		0 mi	
Ecological		Bra								Ecological Thi			
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In	nterti ix	idal		ragmites /etland		hrub/Scrub and brested Wetland	
Exposures	0.	6 mi		0.1 mi		0 1	mi			1.4 mi		0 mi	
										ogical Thresh			
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In	nterti ix	idal		ragmites /etland		hrub/Scrub and brested Wetland	
	0.1 mi 5 mi 1.2 mi 0 mi 0.2 mi										0.2 mi		
						_		_	_	onse Operatio			
										out river for at		et several days.	
												tions and cleanup	
Socioeconomic										rks, marinas, b			
Impacts										west shore from		angston to serienced in other	
	towns al	ong the ri	iver. Wat	ter intakes t	hat ma	y be affected	inclu	ıde: Ron	dout M	lile 92; Rhineb	eck l	Mile 92; Port	
		Ewen Mile 89; Hyde Park Mile 80; Poughkeepsie Mile 77; Highland Mile 76; IBM Mile 72; Danskammer Mile 66; Chelsea Mile 66; Roseton Mile 65. Additional precautionary fishing advisories would likely be instituted for											
				TOIL IVILLE OF	. Audi	precat	itiOHa	y 11511111	ig auvis		KC1y	oc mstituted for	
<del></del>		uch or all of the river.											

### Kingston 150,000-bbl Home Heating Oil Spill (Spring-High Tide) Response

			]	Response Equipme	nt and Plan Activati	on		
	NCP and		Tier	Response Require	nents	G		Ss Activated ays)
	USCG Type	Tier 1 (24	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/c 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	n	/a	35 river miles Mile 90-55 2016-47 to 2016-73
		]	Respons	se Overview: Expec	ted Outcomes and O	Challenge	s	
	Protective B	ooming	Mec	hanical Recovery	Shoreline Clea	anup	Oth	er Challenges
Spill Response	Protective Booming			evaporation and spreading will a amount that can be ared mechanically; ize floating self-cled skimmers; set oreline containment areas with vacuumand skimmers.	About 2% is antic to cause shoreline contamination Per SCAT; wetland fl some substrate rer due to penetration sandy beaches; oil structures; oiled d removal.	form ushing; noval on led dock	oil in his areas; w be challed of wetla response effects; entrainn water co water in concern	I for submerged gh-sediment etland access may enge; disturbance nds during e may cause potential for nent of 26% in olumn leading to take and fish kill s; perform water tracking.

### Kingston 150,000-bbl Home Heating Oil Spill (Spring-Low Tide) Effects

	Loca			ource		/olume	( )	Oil Ty		Season		Tide Stage
Scenario Description	Prope King Anche	osed		collision		0,000 bbl	Н	ome he	_	Spring		Low
Spill	Allend		ıal Prob	ability Any	where	e in Hudson	Rive	er				ual Frequency 2015)
Probability	Spi	ill of Typ	e (Any \	Volume)	S	pill of Type	and	Volum	e	US		Hudson
		0.7	32			0.000	0001	5		0		0
Conditions	Lat/	Lon	Relea	ase Rate	Da	Release ate/Time		Model l Durati		Winds		Water Temperature
Conditions	41.93 -73.9			00 bbl/hr er 4 hrs		April 2016 3:00am		30 da	ys	South / mode (2-15 kts)		48°F
				Mass B	alance	at End of M	Iode	l Run (	After 30	Days)		
	Fate	Surf	ace	Atmosph	nere	Water Column	l	Sec	diment	Ashore	e	Degraded
	%	1.0	%	51.9%	ó	25.7%	5.7% 0.8%			1.5%		19.1%
SIMAP Modeling	bbl	1,4	30	77,82	7	38,538		1	1,187	2,301		28,717
Results	Spatial Extent of Exposure over Threshold (Up to 30 Days After Spill)											
	Water	Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (Length)										
		$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$										
	692,275	mil gal	700,65	52 mil gal	75 mi <sup>2</sup> -days 79 mi <sup>2</sup> -days				days	126 mi		226 mi
						Shore Type	(Mi	iles ove	r Ecolog	ical Threshol	d)	
	Ве	drock	Ţ	Jnconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	artificial Shore
	20	).7 mi		85.4 mi		0.2				9.5 mi		0 mi
Ecological		Bra								Ecological Th		
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland
Laposures	0.	.7 mi		0 mi		0 1	mi			1.6 mi		0 mi
										ogical Thresh		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland
	0.2 mi 6.6 mi 1.1 mi 0 mi 0.1 mi									0.1 mi		
										onse Operatio		
Socioeconomic Impacts	226 mile beaches, would be commerce Cornwal towns al- Ewen M 66; Chel	es of shore parks, and e focused cial prope l, and on ong the ri ile 89; Hy	eline word real est on areas erty, and the east ver. Warde Park	uld be oiled state would s more heav shorefront shore from ter intakes t Mile 80; Pe	l above be affe ily oile real est Rhinel hat ma oughke	the level of exted by oil, is ed (about 126 tate would be beck to Philip y be affected eepsie Mile 7	concernite mile mostow include 7; His	ern for ding res es). Riv st affect vn. Add ude: Ro ighland	socioeco sidue and erside pa ed on the itional ir ondout M Mile 76	l odor. SCAT of arks, marinas, the west shore from pacts may be lile 92; Rhineb; ; IBM Mile 72:	shor opera- beach om K expe eck M	efront marinas, tions and cleanup es, industry, ingston to rienced in other

# Kingston 150,000-bbl Home Heating Oil Spill (Spring-Low Tide) Response

			F	Response Equipment	t and Plan Activatio	n		
	NCP and		Tier	Response Requiren	nents	G		Ss Activated ays)
	USCG Type	Tier 1 (2	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/c 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	1	n/a	32 river miles Mile 90-58 2016-47 to 2016-71
		]	Respons	e Overview: Expect	ed Outcomes and Cl	nallenge	s	
Spill Response	Protective B	ooming	Mecl	nanical Recovery	Shoreline Clear	nup	p Other Challen	
Spill Response	High currents a kt will reduce be effectiveness, containment and diversionary be configurations angled to preve entrainment and over; exclusion deflection confit to be used to presensitive areas.	veraging 1  coom  d  com  to be  ent  d splash  and  igurations  rotect	46% ev rapid spreduce recover mobilization propell up show to boom a	vaporation and preading will amount that can be red mechanically; ze floating selfed skimmers; set reline containment areas with vacuumand skimmers.	About 2% is anticipe to cause shoreline contamination. Perf SCAT; wetland flus some substrate rem due to penetration of sandy beaches; oiled structures; oiled del removal.	form shing; oval on	Potential oil in hig areas; we may be of disturbar during recause eff for entral water cowater into	I for submerged gh-sediment etland access challenge; nce of wetlands esponse may fects; potential inment of 31% in lumn leading to take and fish kill s; perform water

# Kingston 150,000-bbl Home Heating Oil Spill (Summer-High Tide) Effects

						•	·					
G •	Loca		So	ource	1	olume		Oil Ty	pe	Season		Tide Stage
Scenario Description	Propo Kings Ancho	ston	ATB	collision	150	0,000 bbl	Н	ome hea	ating	Summer		High
Spill		Annu	ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Probability	Spi	ll of Typ	e (Any '	Volume)	$\mathbf{S}_{1}$	pill of Type	and `	Volume	•	US		Hudson
		0.7	32			0.000	0001	5		0		0
Conditions	Lat/I			ase Rate	Da	Release ite/Time		Model F Durati		Winds		Water Temperature
Conditions	41.93 -73.95			00 bbl/hr er 4 hrs		ıgust 2016 ):00am		30 day	/S	Light / variab	le	75°F
				Mass B	alance	at End of M	Iode	l Run (A	After 30	Days)		
	Fate	Surf	ace	Atmosph	iere	Water Column	ı	Sed	liment	Ashore	;	Degraded
	%	0.3	%	66.3%	ó	21.1%	0.8%			3.2%		8.4%
SIMAP Modeling	bbl	38	0	99,442	3	31,609		1.	,180	4,758		12,630
Results	Spatial Extent of Exposure over Threshold (Up to 30 Days After Spill)											
	Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (Length)											
	Whol (1 m			ssolved 01 mg/l)		cological 10 g/m²)		ocioecoı (0.01 g		Ecological (100 g/m <sup>2</sup> )		Socioeconomic (1 g/m²)
	190,327			27 mil gal		mi <sup>2</sup> -days		68 mi <sup>2</sup> -0		89 mi	,	108 mi
		-	Shore	line Expos	ure by	Shore Type	(Mi	les over	r Ecolog	ical Thresholo	d)	
	Bee	drock	Ţ	Jnconsolida Rock	ated	Sand l	Beac	h	Mud	or Timber	A	artificial Shore
	15	.6 mi		39.7 mi		2.2	mi		1	5.2 mi		0 mi
Englacian		Bra	ckish/E	stuarine W	etland	Habitats Ex	<b>cpose</b>	ed (Mile	es over I	Ecological Thr	esho	old)
Ecological Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites /etland		nrub/Scrub and prested Wetland
Laposures	C	) mi		0 mi		0 1	mi			0 mi		0 mi
										ogical Thresh		
	Cattai	il Marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites /etland		nrub/Scrub and prested Wetland
	2.9 mi 11.5 mi 1.7 mi 0.2 mi 0.3 mi								0.3 mi			
	Potential Socioeconomic Impacts from Spill and Response Operations											
Socioeconomic Impacts	108 mile beaches, would be commerce and on the the river. Ewen Miles	s of shore parks, an e focused cial prope ne east sho Water in ile 89; Hy	eline word d real est on areas orty, and ore from takes the de Park	uld be oiled state would s more heav shorefront a Hyde Park at may be a Mile 80; Po	above be affe ily oile real est to Hud ffected oughke	the level of octed by oil, ind (about 89 nate would be dison. Additionally include: Uls	conconcludentiles most onal iter M	ern for stating residing resident. River affects impacts file 96; ighland	socioeco idue and side parl ed on the may be o Rondou	odor. SCAT o ks, marinas, be west shore fro experienced in t Mile 92; Rhir	shore pera- ache om E othe nebec	efront marinas, tions and cleanup s, industry, sopus to Catskill,

# Kingston 150,000-bbl Home Heating Oil Spill (Summer-High Tide) Response

			F	Response Equipment	t and Plan Activatio	n		
	NCP and		Tier	Response Requiren	nents	G		Ss Activated ays)
	USCG Type	Tier 1 (2	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Rail Miles River	
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/c 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	:	n/a	33 river miles Mile 80-113 2016-55 to 2016-30
				e Overview: Expect	ed Outcomes and Cl	nallenge	es	
Spill Response	Protective B	ooming	Mecl	nanical Recovery	Shoreline Clear	nup	Othe	er Challenges
Spin Response	High currents we boom effective containment and diversionary be configurations angled to preve entrainment and over; exclusion deflection confit to be used to presensitive areas.	ness, d d foom to be nt d splash and igurations	rapid syreduce recover mobilizy propell up show boom a	vaporation and preading will amount that can be red mechanically; ze floating selfed skimmers; set reline containment areas with vacuumand skimmers.	About 3% is anticipe to cause shoreline contamination. Perf SCAT; wetland flus some substrate rem due to penetration of sandy beaches; oiled structures; oiled del removal.	form shing; oval on d dock	oil in hig areas; we be challed of wetlan response effects; pentrainm column l intake ar	I for submerged the sediment etland access may enge; disturbance and during emay cause potential for 21% lent in water leading to water and fish kill et; perform water tracking.

# Kingston 150,000-bbl Home Heating Oil Spill (Summer-Low Tide) Effects

	T	4	C.		7	7	Ì	O:1 T		Canan		Tida Ctara
Scenario	Loca		80	ource	\	olume		Oil Ty	pe	Season		Tide Stage
Description	Propo King Ancho	ston	ATB	collision	150	0,000 bbl	Н	ome he	ating	Summer		Low
Spill			al Prob	ability Any	where	e in Hudson	Rive	er				ual Frequency 2015)
Probability	Spi	ill of Typ	e (Any '	Volume)	S	pill of Type	and	Volume		US		Hudson
		0.7	'32			0.000	0001	5		0		0
Conditions	Lat/I			ase Rate	Da	Release nte/Time		Model F Durati		Winds		Water Temperature
Conditions	41.93 -73.95			00 bbl/hr er 4 hrs		1gust 2016 5:30am		30 day	/S	Light / variab (<5 kts)	ole	75°F
				Mass B	alance	at End of M	Iode	l Run (	After 30	Days)		
	Fate	Surf	ace	Atmosph	iere	Water Column	l	Sed	liment	Ashore	,	Degraded
	%	0.2	%	66.2%	Ď	21.2%		0	.6%	3.2%		8.6%
SIMAP Madeling	bbl	<b>a)</b> 301 99,324 31,830 889 4,764								12,892		
Modeling Results			Spatia	al Extent of	Expo	sure over Th	resh	old (Up	to 30 I	Days After Spi	<b>ll</b> )	
	Water	r (Volum	e) – Eco	ological	Sur	face (Area x	Day	ys Expo	sed)	Shore	eline	(Length)
	Whol			ssolved		cological		ocioecoi		Ecological		Socioeconomic
	(1 n 196,345			<b>01 mg/l)</b> 59 mil gal	(10 g/m <sup>2</sup> ) (0.01 g/ 264 mi <sup>2</sup> -days 266 mi <sup>2</sup> -d			( <b>100 g/m²</b> ) 91 mi	)	(1 g/m²) 114 mi		
	170,545	nin gai		reline Exposure by Shore Type (Miles over Ecolo						-	4)	114111
				Jnconsolida		1						4101 1 1 (1)
	Bee	drock		Rock		Sand 1	Веас	h	Mud	or Timber	A	artificial Shore
	12	.1 mi		35 mi		2.1	mi		2	1.3 mi		0 mi
Ecological		Bra								Ecological Thr		
Shoreline	Salt	marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites /etland		nrub/Scrub and prested Wetland
Exposures	C	) mi		0 mi		0 1	mi			0 mi		0 mi
			Freshw	ater Wetla	nd Ha	bitats Expos	ed (I	Miles ov	er Ecol	ogical Thresh	old)	
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites /etland		nrub/Scrub and prested Wetland
	3.3 mi 13.8 mi 1.9 mi 0.5 mi 1.1 mi								1.1 mi			
	Potential Socioeconomic Impacts from Spill and Response Operations  Response operations may cause major impacts to ports in Albany and throughout river for at least several days.											
Socioeconomic Impacts	114 mile beaches, would be commerc Coxsack towns ale Mile 92;	es of shore parks, and e focused cial properie, and or ong the riport Ewe	eline wo d real es on areas rty, and the easi ver. Wat en Mile 8	uld be oiled state would s more heav shorefront t shore from ter intakes t 89; Hyde Pa	above affe affe oile oile oile oile oile oile oile oil	the level of acted by oil, it ad (about 91 it ate would be resant to Hydry be affected)	conconcludentiles most e Particular includentiles e Particular includentiles most e Particular includentiles e Particular includentiles e Particular includent	ern for siding residing residents. River affecters. Additude: Ulside Mile	socioeco idue and rside par ed on the itional in ster Mile 77; Higl	nomic effects; odor. SCAT o ks, marinas, be west shore fro npacts may be 96; Rondout Mand Mile 76.	shore pera- eache om E expe Mile	efront marinas, tions and cleanup s, industry, sopus to rienced in other 92; Rhinebeck

# Kingston 150,000-bbl Home Heating Oil Spill (Summer-Low Tide) Response

			]	Response Equipmen	t and Plan Activati	on				
	NCP and		Tier	Response Requiren	nents	G		Ss Activated lays)		
	USCG Type	Tier 1 (2	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail Miles		River Miles		
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/c 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	n	/a	43 river miles Mile 80-123 2016-55 to 2016-23		
				e Overview: Expect	ted Outcomes and O	mes and Challenges				
Spill Response	Protective B	ooming	Mec	hanical Recovery	Shoreline Clea	anup	Oth	er Challenges		
Spin Response	High currents a kt will reduce be effectiveness, containment an diversionary be configurations angled to preve entrainment and over; exclusion deflection confi	d d doom to be nt d splash and igurations	rapid s reduce recove mobili propel up sho boom	vaporation and spreading will amount that can be red mechanically; ze floating self-led skimmers; set reline containment areas with vacuum-and skimmers.	About 3% is antic to cause shoreline contamination. Pe SCAT; wetland fit some substrate rer due to penetration sandy beaches; oil structures; oiled d removal.	ipated erform ushing; moval on led dock	Potentia oil in hi areas; w be chall of wetla respons- effects; entrainr column intake a	al for submerged gh-sediment vetland access may enge; disturbance ands during e may cause potential for 21% ment in water leading to water nd fish kill		
	to be used to pr sensitive areas.							s; perform water tracking.		

### Kingston 150,000-bbl Home Heating Oil Spill (Winter-High Tide) Effects

							•						
g .	Loca		So	ource	7	olume		Oil Ty	pe	Season		Tide Stage	
Scenario Description	Propo King Ancho	ston	ATB	collision	150	),000 bbl	Н	ome he	ating	Winter		High	
Spill			ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)	
Probability	Spi	ill of Typ	e (Any \	Volume)	$S_{]}$	pill of Type	and '	Volum	e	US		Hudson	
		0.7	732			0.000	00015	5		0		0	
Conditions	Lat/		Relea	ase Rate	Da	Release te/Time		Model I Durati		Winds		Water Temperature	
Conditions	41.93 -73.93		,	00 bbl/hr er 4 hrs		uary 2016 :00am		30 day	ys	Light / variab (<5 kts)	le	32°F	
				Mass B	alance	at End of M	Iodel	Run (	After 30	Days)		_	
	Fate	Column											
GD 5 A D	%	10.:	5%	64.6%	ó	8.6%		(	).9%	7.1%		8.2%	
SIMAP Modeling	bbl	15,7	790	96,87	1	12,966		1	,379	10,666	5	12,328	
Results	Spatial Extent of Exposure over Threshold (Up to 30 Days After									<u> </u>			
		r (Volum		Ü		face (Area x						(Length)	
	Who (1 n	le Oil 1g/l)	(0.0	ssolved 01 mg/l)	(1	cological 10 g/m²)		cioeco (0.01 g	$/\mathbf{m}^2$ )	Ecologica (100 g/m <sup>2</sup>	<b>l</b>	Socioeconomic (1 g/m²)	
	219,259	mil gal	205,46	61 mil gal	361	mi <sup>2</sup> -days					120 mi		
						Shore Type	e (Mi	les ove	r Ecolog	ogical Threshold)			
	Be	drock	τ	Jnconsolida Rock	ated	Sand	Beac	h	Mud	or Timber	A	Artificial Shore	
	19	.1 mi		81.6 mi		0.7				9.2 mi		0 mi	
Ecological		Bra								Ecological Th			
Shoreline	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		hrub/Scrub and orested Wetland	
Exposures	(	) mi		0 mi		0 1				0 mi		0 mi	
			Freshw	ater Wetla	nd Hal	oitats Expos	ed (N	Miles o	ver Ecol	logical Thresh	old)		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		hrub/Scrub and orested Wetland	
	0.	8 mi		6.6 mi		1.9	mi			0 mi		0.3 mi	
	Potential Socioeconomic Impacts from Spill and Response Operations  Response operations may cause major impacts to ports in Albany and throughout river for at least several days.												
Socioeconomic Impacts	136 miles of shoreline would be oiled above the level of concern for socioeconomic effects; shorefront marinas, beaches, parks, and real estate would be affected by oil, including residue and odor. SCAT operations and cleanup would be focused on areas more heavily oiled (about 120 miles). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate would be most affected on the west shore from Saugerties to Lloyd, and on the east shore from Poughkeepsie to Red Hook. Additional impacts may be experienced in other towns along the river. Water intakes that may be affected include: Ulster Mile 96; Rondout Mile 92; Rhinebeck Mile 92; Port Ewen Mile 89; Hyde Park Mile 80; Poughkeepsie Mile 77; Highland Mile 76; IBM Mile 72; Danskammer Mile 66; Chelsea Mile 66. Additional precautionary fishing advisories would likely be instituted for much or all of the river.												

# Kingston 150,000-bbl Home Heating Oil Spill (Winter-High Tide) Response

				D	4 1 Dl 4 -4' -4'				
	NCP and			Response Equipmen Response Requiren				Ss Activated ays)	
	USCG Type	Tier 1 (2	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles	
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/d 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	n	/a	30 river miles Mile 100-70 2016-39 to 2016-61	
				se Overview: Expect		Challenge	s		
	Protective B	ooming	Mec	hanical Recovery	Shoreline Clea	anup	Oth	er Challenges	
	Ice conditions i			vaporation and	About 7% is anticipated			l for submerged	
Spill Response	response operate currents will re-					to cause shoreline contamination. Perform		gh-sediment retland access may	
	effectiveness,	auce boom	recovered mechanically;		SCAT; wetland flu			enge; disturbance	
	containment an			ze floating self-	some substrate rer			nds during	
	diversionary bo configurations			led skimmers; set oreline containment	due to penetration on sandy beaches; oiled doc structures; oiled debris			e may cause potential for 9%	
	angled to preve			areas with vacuum-				nent in water	
	entrainment and			and skimmers.	removal.			leading to water	
	over; exclusion deflection confi		rations may affect mechanical concerns especi						
	to be used to pr								
	sensitive areas.	1						dilution; perform	
	Potential ice conditions may affect boom						water co	olumn tracking.	
	deployment.								

### Kingston 150,000-bbl Home Heating Oil Spill (Winter-Low Tide) Effects

					_		_			Hac) Ei		
~ .	Loca	tion	So	ource	V	olume		Oil Ty	pe	Season		Tide Stage
Scenario Description	Propo King Ancho	ston	ATB	collision	150	),000 bbl	Н	ome he	ating	Winter		Low
Spill		Annu	al Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Probability	Spi	ill of Typ	e (Any V	Volume)	$S_{l}$	oill of Type	and \	Volume	e	US		Hudson
		0.7	32			0.000	00015	5		0		0
Conditions	Lat/			ase Rate	Da	Release te/Time		Aodel I Durati		Winds		Water Temperature
Conditions	41.93 -73.9			00 bbl/hr er 4 hrs		anuary 5 9:00am		30 day	ys	Light / variab (<5 kts)	le	32°F
				Mass B	alance	at End of M	Iodel	Run (	After 30	Days)		
	Fate	- Column								Degraded		
	%	10.7	7%	64.4%	ó	8.6%		C	).7%	7.1%		8.5%
SIMAP Modeling	bbl	<b>bbl</b> 16,085 96,592 12,857 1,111 10,678 1								12,678		
Modeling Results			Spatia	l Extent of	Expos	sure over Th	resh	old (U <sub>I</sub>	p to 30 D	ays After Spi	ll)	
	Water	r (Volum	e) – Eco	logical	Sur	face (Area x	Day	s Expo	sed)	Shore	line	(Length)
		le Oil		ssolved		cological		cioeco		Ecological		Socioeconomic
	(1 n 214,377			01 mg/l)	(10 g/m <sup>2</sup> ) 373 mi <sup>2</sup> -days		( <b>0.01 g/m<sup>2</sup></b> ) 448 mi <sup>2</sup> -days			(100 g/m <sup>2</sup> )	)	( <b>1 g/m²</b> ) 135 mi
	214,377	nin gui	212,355 mil gal 373 mi²-days 448 mi²-days  Shoreline Exposure by Shore Type (Miles over Ecolog						4)	133 III		
				Jnconsolida								4461 1 1 61
	Ве	drock		Rock		Sand 1	Beac	h	Mud	or Timber	A	artificial Shore
	18	.6 mi		80.6 mi		0.9	mi		9	9.4 mi 0 mi		
Ecological		Bra								<b>Ecological Thr</b>		
Shoreline	Salt	marsh	U	pper Inter Mix	tidal	Lower II		idal		agmites etland		nrub/Scrub and prested Wetland
Exposures	(	) mi		0 mi		0 1				0 mi	10	0 mi
			Freshwa	ater Wetla	nd Hal	itats Expos	ed (N	Ailes ov	ver Ecolo	gical Thresh	old)	
	Catta	il Marsh		pper Inter Mix		Lower In	nterti		Phr	agmites etland	Sh	nrub/Scrub and prested Wetland
	0.	9 mi		7.1 mi		2.3	mi			0 mi		0.3 mi
	Potential Socioeconomic Impacts from Spill and Response Operations											
Socioeconomic Impacts	Response operations may cause major impacts to ports in Albany and throughout river for at least several days. 135 miles of shoreline would be oiled above the level of concern for socioeconomic effects; shorefront marinas, beaches, parks, and real estate would be affected by oil, including residue and odor. SCAT operations and cleanup would be focused on areas more heavily oiled (about 120 miles). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate would be most affected on the west shore from Saugerties to Lloyd, and on the east shore from Poughkeepsie to Red Hook. Additional impacts may be experienced in other towns along the river. Water intakes that may be affected include: Ulster Mile 96; Rondout Mile 92; Rhinebeck Mile 92; Port Ewen Mile 89; Hyde Park Mile 80; Poughkeepsie Mile 77; Highland Mile 76; IBM Mile 72. Additional precautionary fishing advisories would likely be instituted for much or all of the river.								efront marinas, tions and cleanup les, industry, augerties to enced in other 92; Rhinebeck I Mile 72.			

### Kingston 150,000-bbl Home Heating Oil Spill (Winter-Low Tide) Response

			I	Response Equipmen	t and Plan Activati	on		
	NCP and		Tier	Response Requiren	nents	Gl		Ss Activated lays)
	USCG Type	Tier 1 (24	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/d 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	n	/a	27 river miles Mile 100-73 2016-39 to 2016-60
		j	Respons	e Overview: Expect	ted Outcomes and O	Challenge	s	
	Protective B	ooming	Mec	hanical Recovery	Shoreline Clea	anup	Oth	er Challenges
Spill Response	Ice conditions of response operations of the control of the control of the conditions of the configurations of the configurations over; exclusion deflection configuration of the	d doom to be nt d splash and igurations otect	respon evapor spread amoun recove mobili propel up sho boom trucks Potent may af	nditions may hinder use operations; 64% ration and rapid ing will reduce to the tred mechanically; ze floating self-led skimmers; set reline containment areas with vacuumand skimmers. ial ice conditions refect mechanical rey operations.	About 7% is antic to cause shoreline contamination. Pe SCAT; wetland fl some substrate rer due to penetration sandy beaches; oil structures; oiled d removal.	erform ushing; noval on led dock	oil in hi areas; w be chall- of wetla response effects; entrainn column intake a concern areas ne to diluti	al for submerged gh-sediment vetland access may enge; disturbance ands during e may cause potential for 9% ment in water leading to water and fish kill s especially in ear spill site prior on; perform water tracking.

### Proposed Kingston Anchorage 150,000-bbl Diluted Bitumen Oil Spill

Kingston 150,000-bbl Diluted Bitumen Spill (Spring-High Tide) Effects

	Loca	tion	Sc	ource	V	olume		Oil Ty	no.	Season		Tide Stage
Scenario	Propo		50	Jurce	•	Olullic		On Ty	pc	Scason		Tide Stage
Description	Kings Ancho	ston	ATB	collision	150	),000 bbl	Dil	luted B	itumen	Spring		High
Spill		Annua	l Proba	bility Any	where	in Hudson I	River	r				ual Frequency 2015)
Probability	Spi	ll of Type	(Any V	olume)	$S_1$	pill of Type	and	Volum	e	US		Hudson
		0.73	32			0.000	00015	5		0		0
	Lat/l	Lon	Relea	ase Rate		Release te/Time		Model l Durati		Winds		Water Temperature
Conditions	41.9 -73.9	3017 5700		00 bbl/hr er 4 hrs		pril 2016 :00am		30 day	ys	South / moderate (2- 15 kts)	-	48°F
				Mass Ba	lance a	t End of M	odel	Run (A	After 30	Days)		
	Fate	Surfa	ace	Atmospl	nere	Water Column	l	Sec	liment	Ashore	)	Degraded
	%	51.5	%	28.2%	ó	1.2%		C	0.6%	5.6%		4.4%
SIMAP Modeling	bbl	77,192 42,245 1,730 843						843	8,361		6,540	
Results	Spatial Extent of Exposure over Threshold (Up to 30 Da								ays After Spil	ill)		
	Water	Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (Lengt									(Length)	
		le Oil		ssolved		cological		cioeco		Ecological		Socioeconomic
	70,481 i			<b>01 mg/l)</b> 74 mil gal		l <b>0 g/m<sup>2</sup>)</b> mi <sup>2</sup> -days		( <b>0.01 g</b> 85 mi <sup>2</sup> -		(100 g/m <sup>2</sup> ) 184 mi	)	(1 g/m²) 304 mi
	70,401	imi gai				<u>.</u>				ical Threshold	1)	304 III
				Jnconsolid								1.60 · 1.61
		drock		Rock		Sand 1	веас	e <b>n</b>	Mud	or Timber	F	Artificial Shore
	21	.8 mi		120.3 m		0.4				8.7 mi		0 mi
Ecological		Bracl				<u> </u>				Cological Thr		
Shoreline	Salt	marsh	U	pper Inter Mix	tidal	Lower II		tidal		ragmites Vetland		hrub/Scrub and orested Wetland
Exposures	1.	6 mi		1.1 mi		0.2				3.7 mi		0 mi
		F	reshwat	ter Wetlan	d Habi	tats Expose	d (M	liles ov	er Ecolo	ogical Thresho	old)	
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites Vetland		hrub/Scrub and orested Wetland
	2.1 mi 11.7 mi 2 mi 0 mi 0.3 mi									0.3 mi		
	Potential Socioeconomic Impacts from Spill and Response Operations  Response operations may cause major impacts to ports in Albany and throughout river for at least several days.											
Socioeconomic Impacts	304 miles beaches, I would be commerci Cornwall, towns alo Ewen Mil	of shorelic parks, and focused of ial properts, and on the ing the rive le 89; Hyde ea Mile 66	ne woul real esta n areas r y, and sl e east sh er. Wate e Park N s; Roseto	d be oiled a nte would b nore heavil horefront re nore from R r intakes th Mile 80; Po	above to a state of the affect	he level of coted by oil, in (about 184 at the would be a cote affected in pose Mile 77	once cludi miles most n. Ad inclu : Hig	rn for s ing resi s). Rive affecte dditiona de: Ror ghland l	ocioecondue and rside part don the limpact idout Moule 76;	nomic effects; sodor. SCAT of rks, marinas, b west shore from the solution of	shor pera each om K riend eck I Dar	efront marinas, tions and cleanup nes, industry, tingston to ced in other

### Kingston 150,000-bbl Diluted Bitumen Spill (Spring-High Tide) Response

			R	esponse Equipment	and Plan Activation	n		
	NCP and		Tier	Response Requiren	nents	G		Ss Activated lays)
	USCG Type	Tier 1 (24	hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major WCD	25,000 ft bo 1,000 ft + 30 skimming sy 1,875 bbl/da 3,750 bbl sto	00 per ystem ay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	n	ı/a	30 river miles Mile 90-60 2016-47 to 2016-69
		Re	sponse	Overview: Expecte	d Outcomes and Cl	nallenges	5	
	Protective B	ooming	Mec	hanical Recovery	Shoreline Clea	nup	Othe	er Challenges
Spill Response <sup>9</sup>	An average curre velocity of 1 kt r high currents was boom effectivened containment and diversionary book configurations to prevent entrains splash over; excludeflection configuration configurations are as.	results in reducing ess, om o be angled nment and lusion and gurations to	veloci skimm evapor spread amour recove mobili propel up sho boom	ge 1 kt current ties may affect ner operations, 28% ration and rapid ling will reduce nt that can be ered mechanically; ize floating self- iled skimmers; set oreline containment areas with vacuum- and skimmers.	Approximately 6% impact on shorelin Perform SCAT; we flushing; some subtemoval due to penetration on sambaches; oiled doc structures; oiled de removal.	etland etland ostrate dy k	oil in his especial evaporal access in disturba during in cause effor 1% ewater collead to visible kill near spil dilution; column bottom of determining submergibottom I	If for submerged gh-sediment areas ly as the diluents te; wetland may be challenge; nce of wetlands esponse may fects; potential entrainment in plumn which may water intake and concerns in areas ll site prior to ; perform water tracking, perform drags to me extent of ged oil on river thowever at <1%, be detectable.

<sup>&</sup>lt;sup>9</sup> Non-floating oil, therefore OSROs are required to be certified having capabilities as follows: detection; recovery; storage; and optional containment for submerged oil.

# Kingston 150,000-bbl Diluted Bitumen Spill (Spring-Low Tide) Effects

	Lago	tion.	C.	ource		olume				Season		Tido Ctoro
Scenario	Location Proposed Kingston Anchorage		30	ource	•	olume		Oil Ty	pe	Season		Tide Stage
Description			ATB	collision	150	0,000 bbl	Dil	luted B	itumen	Spring		Low
Spill		Annua	l Proba	bility Anyv	where	in Hudson I	River	•				ual Frequency 2015)
Probability	Spi	ill of Type	(Any V	olume)	S	pill of Type	and	Volum	ie	US		Hudson
-		0.73	32			0.000	00015	5		0		0
Conditions	Lat/			ase Rate	Da	Release ite/Time		Model l Durati		Winds		Water Temperature
Conditions	41.93 -73.9			00 bbl/hr er 4 hrs		pril 2016 1:00am		30 da	ys	South / moder (4-15 kts)	ate	48°F
				Mass Ba	lance a	at End of M	odel	Run (A	After 30	Days)		
	Fate	Surfa	ace	Atmosph	iere	Water Column	ļ	Sec	liment	Ashore	,	Degraded
									).8%	6.1%		4.5%
SIMAP	bbl	77,89	96	42,089	9	1,817		1	,163	9,184		6,789
Modeling Results	Spatial Extent of Exposure over Threshold (Up to								to 30 D	ays After Spil	<b>l</b> )	
	Water (Volume) - Ecological Surface (Area x Days Exposed)									Shorelin		(Length)
	Whole Oil   Dissolved   Ecological   Socioeconom (1 mg/l)   (0.001 mg/l)   (10 g/m²)   (0.01 g/m²)									Ecological (100 g/m <sup>2</sup> )		Socioeconomic (1 g/m²)
	83,502			l 6 mil gal		mi <sup>2</sup> -days		93 mi <sup>2</sup> -		193 mi		321 mi
			Shoreli	ne Exposu	re by	Shore Type	(Mil	es over	Ecologi	ical Threshold	<b>I</b> )	
	Be	drock	J	Jnconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	artificial Shore
	22	2.9 mi		125.8 m	i	0.6	mi		1	9.7 mi		0 mi
Factoriant		Brack	kish/Est	uarine We	tland l	Habitats Ex	pose	d (Mile	s over E	<b>Ecological Thr</b>	esho	old)
Ecological Shoreline	Salt	marsh	U	pper Inter	tidal	Lower In		idal		ragmites Vetland		nrub/Scrub and prested Wetland
Exposures	1.	.6 mi		1.3 mi		0.2				2.8 mi	FU	0 mi
			reshwat		d Hab			liles ov		gical Thresho	old)	Ų III
	Catta	il Marsh		pper Inter Mix		Lower In	ntert		Ph	ragmites Vetland	Sl	nrub/Scrub and prested Wetland
	2.	.6 mi		12.7 mi		2.4				0 mi		0.3 mi
	Potential Socioeconomic Impacts from Spill and Response Operations											
		operation	s may ca	use major	impact	s to ports in	Alba	ny and	through	out river for at	leas	
												efront marinas, tions and cleanup
Socioeconomic										rks, marinas, b		
Impacts	commerc	ial propert	y, and sl	norefront re	al esta	te would be	most	affecte	d on the	west shore fro	m E	sopus to
										npacts may be e ile 92; Rhinebe		rienced in other
	Ewen Mile 89; Hyde Park Mile 80; Poughkeepsie Mile 77; Highland Mile 76; IBM Mile 72; Danskammer Mile 66; Chelsea Mile 66; Roseton Mile 65. Additional precautionary fishing advisories would likely be instituted for											
	much or a	much or all of the river.										

#### Kingston 150,000-bbl Diluted Bitumen Spill (Spring-Low Tide) Response

	•			Response Equipmen	<u> </u>		<u> </u>		
	NCP and			Response Requiren				Ss Activated lays)	
	USCG Type	Tier 1 (24 l	hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail I	Miles	River Miles	
	Major WCD	25,000 ft boo 1,000 ft + 30 skimming sy 1,875 bbl/day 3,750 bbl sto	0 per stem	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	n/a		34 river miles Mile 92-58 2016-46 to 2016-75	
				se Overview: Expect	ed Outcomes and O	Challenges			
	Protective 1	Booming	Me	echanical Recovery	Shoreline Cle	anup	Oth	er Challenges	
Spill Response <sup>10</sup>	An average curvelocity of 1 kt high currents w boom effectives containment and diversionary bo configurations to prevent entrasplash over; except deflection confibe used to prote areas.	results in reducing ness, doom to be angled inment and clusion and agurations to	veloc skim evape sprea amou recov mobi propo up sh boon	rage 1 kt current cities may affect mer operations, 28% oration and rapid ading will reduce ant that can be wered mechanically; ilize floating self-elled skimmers; set noreline containment in areas with vacuum-ts and skimmers.		ne. wetland abstrate ndy	oil in hi areas es diluents wetland challen wetland may car potentia entraini column to wates kill con near spi dilution column bottom determi submer bottom	al for submerged igh-sediment specially as the sevaporate; I access may be ge; disturbance of Is during response use effects; al for 1% ment in water which may lead r intake and fish accens in areas ill site prior to a; perform water tracking, perform drags to ne extent of ged oil on river however at <1%, t be detectable.	

 $<sup>^{10}</sup>$  Non-floating oil, therefore OSROs are required to be certified having capabilities as follows: detection; recovery; storage; and optional containment for submerged oil.

# Kingston 150,000-bbl Diluted Bitumen Spill (Summer-High Tide) Effects

	Loca	tion	So	ource	7	olume		Oil Ty	ре	Season		Tide Stage
Scenario Description	Prop King Anch	ston	ATB	collision	150	0,000 bbl	Di	luted B	itumen	Summer		High
Spill			l Proba	bility Any	where	in Hudson I	Rive	r				ual Frequency 2015)
Probability Probability	Spi	ll of Type	(Any V	olume)	S	pill of Type	and	Volum	e	US		Hudson
		0.73	32			0.000				0		0
Conditions	Lat/			ase Rate	Da	Release ite/Time	I	Model l Durati		Winds		Water Temperature
Conditions	41.93 -73.9			00 bbl/hr er 4 hrs		ugust 2016 0:00am		30 da	ys.	Light / variat (<5 kts)	ole	75°F
				Mass Ba	lance a	at End of M	odel	Run (A	After 30	Days)		
	Fate	Surfa	ace	Atmospl	nere	Water Column		Sed	liment	Ashore	!	Degraded
	%	58.9	%	28.9%	ó	1.3%		0	.8%	6.0%		4.1%
SIMAP Modeling	bbl	88,3	36	43,31	5	1,924		1	,157	9,075		6,201
Results			Spatial	Extent of 1	Exposi	ire over Thi	esh	old (Up	to 30 D	ays After Spil	ll)	
	Water	r (Volume	•	Ü		face (Area x			,			(Length)
	Who	le Oil ng/l)		ssolved 01 mg/l)		cological 10 g/m²)	So	ocioeco (0.01 g		Ecological (100 g/m <sup>2</sup> )	l	Socioeconomic (1 g/m <sup>2</sup> )
	53,137	<u> </u>		23 mil gal		mi <sup>2</sup> -days	4	11 mi <sup>2</sup> -		135 mi	,	139 mi
	,				L					ical Threshold	<b>l</b> )	
	Be	drock	Ţ	Unconsolid Rock	ated	Sand	Beac	ch	Mud	or Timber	A	Artificial Shore
	16	.4 mi		50.2 mi		2.2	mi		3	32.1 mi		0 mi
		Bracl	xish/Est	uarine We	tland 1	Habitats Exp	pose	d (Mile	s over I	Ecological Thr	esho	old)
Ecological Shoreline	Salt	marsh	U	pper Inter Mix	tidal	Lower In		tidal		ragmites Vetland		rub/Scrub and rested Wetland
Exposures	(	) mi		0 mi		0 1	mi			0 mi		0 mi
		F								ogical Thresho		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		tidal		ragmites Vetland		rub/Scrub and rested Wetland
	5.	6 mi		23.1 mi		3.9	mi			0.2 mi		1.7 mi
						_		_	_	nse Operation		
Socioeconomic Impacts	139 miles beaches, j would be commerce and on the the river. Ewen Mil	of shoreli parks, and focused of ial propert e east shor Water intalle 89; Hyd	ne would real estain areas in y, and slow re from I lakes that e Park M	Id be oiled a ate would b more heavil horefront re Hudson to F may be aff Mile 80; Po	above to a state above to a state above to a state above the contraction of the contracti	he level of co ted by oil, in (about 135 to te would be to eepsie. Addi nclude: Ulsto	once clud miles most tions er M ; Hig	rn for s ing resi s). Rive affecte al impac ile 96; I ghland I	ocioeco due and rside pa d on the ets may Rondout Mile 76;	odor. SCAT oprks, marinas, bewest shore from the experienced Mile 92; Rhin IBM Mile 72.	short perate each om C in c lebec	efront marinas, tions and cleanup les, industry, atskill to Milton, other towns along ck Mile 92; Port

### Kingston 150,000-bbl Diluted Bitumen Spill (Summer-High Tide) Response

			R	Response Equipment	and Plan Activation	1		
	NCP and		Tier	· Response Requiren	nents	G	GRPs/ GRS (7 d	Ss Activated ays)
	USCG Type	Tier 1 (24	hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rai	l Miles	River Miles
	Major WCD	25,000 ft boo 1,000 ft + 30 skimming sy 1,875 bbl/da 3,750 bbl sto	00 per estem	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage		n/a	40 river miles Mile 115-75 2016-28 to 2016-58
		R	esponse	e Overview: Expecte	d Outcomes and Cha	allenges	5	
	Protective 1	Booming	Med	chanical Recovery	Shoreline Clear	nup	Othe	r Challenges
Spill Response <sup>11</sup>	An average curvelocity of 1 kt high currents whoom effective containment and diversionary be configurations to prevent entrasplash over; ex deflection confit to be used to presentitive areas.	results in reducing ness, doom to be angled ainment and clusion and igurations rotect	veloci skimm evapo spread amoun recove mobil prope up sho boom	age 1 kt current ities may affect ner operations, 28% oration and rapid ding will reduce nt that can be ered mechanically; ize floating self- lled skimmers; set oreline containment areas with vacuum- s and skimmers.	Approximately 6% impact on shoreline Perform SCAT; we flushing; some subsremoval due to penetration on sand beaches; oiled dock structures; oiled del removal.	tland strate y	oil in hig especially evaporate access m disturban during re cause eff for 1% en water col- lead to w fish kill of near spill dilution; column t bottom d determin- submerge bottom h	for submerged h-sediment areas y as the diluents e; wetland ay be challenge; ace of wetlands sponse may ects; potential intrainment in tumn which may eater intake and concerns in areas a site prior to perform water racking, perform rags to e extent of ed oil on river owever at <1%, be detectable.

Non-floating oil, therefore OSROs are required to be certified having capabilities as follows: detection; recovery; storage; and optional containment for submerged oil.

# Kingston 150,000-bbl Diluted Bitumen Spill (Summer-Low Tide) Effects

	Loca	tion	Se	ource	7	olume		Oil Ty	pe	Season		Tide Stage
Scenario Description	Propo King Ancho	ston	ATB	collision	150	0,000 bbl	Di	luted B	itumen	Summer		Low
Spill			ıl Proba	bility Any	where	in Hudson I	Rive	r				ual Frequency 2015)
Probability Probability	Spi	ll of Type	(Any V	olume)	S	pill of Type	and	Volum	e	US		Hudson
-		0.73	32			0.000	0001	5		0		0
Conditions	Lat/			ase Rate	Da	Release ite/Time		Model l Durati		Winds		Water Temperature
Conditions	41.93 -73.93			00 bbl/hr er 4 hrs		igust 2016 5:30am		30 da	ys	Light / varia (<5 kts)	ble	75°F
				Mass Ba	lance a	at End of M	odel	Run (A	After 30	Days)		1
	Fate	Surfa	ace	Atmosph	nere	Water Column		Sed	iment	Ashore		Degraded
	%	59.0	%	28.9%	Ď	1.2%		0	.8%	5.9%		4.2%
SIMAP Modeling	bbl	88,4	86	43,32	5	1,736		1	,188	8,922		6,350
Results			Spatial	Extent of l	Exposi	ire over Thi	esho	old (Up	to 30 D	ays After Spil	1)	
		r (Volume	•	Ü		face (Area x						(Length)
	Whol (1 n			ssolved 01 mg/l)		cological 10 g/m²)	So	ocioeco (0.01 g		Ecological (100 g/m <sup>2</sup> )		Socioeconomic (1 g/m²)
	68,235			45 mil gal		mi <sup>2</sup> -days	4	$06 \text{ mi}^2$		131 mi	,	134 mi
		<del>_</del>	Shoreli	ine Exposu	re by S	Shore Type	(Mil	es over	Ecolog	ical Threshold	l)	
	Bee	drock	Ţ	Unconsolida Rock	ated	Sand 1	Beac	ch	Mud	or Timber	A	artificial Shore
	14	.6 mi		45.7 mi		2.2	mi		3	32.9 mi		0 mi
		Bracl	kish/Est	uarine We	tland l	Habitats Exp	pose	d (Mile	s over I	Cological Thr	esho	old)
Ecological Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		tidal		ragmites Vetland		nrub/Scrub and prested Wetland
Exposures	C	) mi		0 mi		0.1	mi			0 mi		0 mi
		F								gical Thresho		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		tidal		ragmites Vetland		nrub/Scrub and prested Wetland
	6.	2 mi		23.8 mi		4.3	mi			0.2 mi		0.7 mi
						_		_	_	nse Operation		
Socioeconomic Impacts	134 miles beaches, j would be commerci and on the river. War Ewen Mil	of shorelication of sho	ne would real estain areas in y, and slower from I that made Park M	Id be oiled a ate would b more heavil horefront re Hudson to I y be affecte Mile 80; Pou	above to affect y oiled al esta Hyde Ped included	he level of co ted by oil, in (about 131 to te would be to ark. Addition tde: Ulster M	once clud miles most nal ir lile 9 ; Hig	rn for s ing resi s). Rive affecte npacts 1 96; Ron ghland I	ocioecordue and rside pad on the may be odout Mi	odor. SCAT op rks, marinas, bo west shore fro	shore perateach m A othe ck M	efront marinas, tions and cleanup es, industry, thens to Lloyd, r towns along the lile 92; Port

#### Kingston 150,000-bbl Diluted Bitumen Spill (Summer-Low Tide) Response

	-		Res	sponse Equipment a	and Plan Activation			
	NCP and			Response Requirer			RPs/ GRS	s Activated nys)
	USCG Type	Tier 1 (2	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rai	l Miles	River Miles
	Major 1,000 skimm 1,875 3,750  Protective Booming			25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage		n/a	35 river miles Mile 115-80 2016-28 to 2016-55
					l Outcomes and Cha	allenges	3	
	Protective Boo	oming	Mech	anical Recovery	Shoreline Clean	nup	Other	Challenges
Spill Response <sup>12</sup>	An average currer velocity of 1 kt rehigh currents were boom effectiveness containment and diversionary boom configurations to to prevent entrains splash over; excludeflection configurations to be used to protessensitive areas.	sults in educing ss, n be angled ment and sion and urations	velocitic skimme evapora spreadin amount recover mobiliz propelle up shore boom an	e 1 kt current es may affect er operations, 28% ation and rapid ang will reduce that can be ed mechanically; e floating self- ed skimmers; set elline containment reas with vacuum- and skimmers.	Approximately 6% impact on shoreline Perform SCAT; we flushing; some substremoval due to penetration on sand beaches; oiled dock structures; oiled det removal.	tland strate y	oil in high areas espe diluents e wetland a challenge wetlands may cause potential entrainme column w to water i kill concenear spill dilution; j column tr bottom di determine submerge bottom he	ccess may be ; disturbance of during response e effects; for 1% ent in water which may lead ntake and fish erns in areas site prior to perform water racking, perform

<sup>&</sup>lt;sup>12</sup> Non-floating oil, therefore OSROs are required to be certified having capabilities as follows: detection; recovery; storage; and optional containment for submerged oil.

# Kingston 150,000-bbl Diluted Bitumen Spill (Winter-High Tide) Effects

	Loca	tion	Sc	ource	V	olume		Oil Ty	ne	Season		Tide Stage
Scenario Description	Prop King	osed gston		collision		),000 bbl	Di	luted Bi		Winter		High
Cn:II	Anch		l Proba	bility Any	where	in Hudson I	Rive	r				ual Frequency 2015)
Spill Probability	Spi	ll of Type	(Any V	olume)	S	pill of Type	and	Volum	e	US		Hudson
J		0.73	32			0.000	0001	5		0		0
Conditions	Lat/			ase Rate	Da	telease te/Time		Model I Durati		Winds		Water Temperature
Conditions	41.9 -73.9	3017 5700		00 bbl/hr er 4 hrs		uary 2016 :00am		30 day	ys .	Light / variab (<5 kts)	ole	32°F
				Mass Ba	lance a	t End of M	odel	Run (A	After 30	Days)		
	Fate	Surfa	ace	Atmospl	here	Water Column		Sed	liment	Ashore	;	Degraded
	%	57.6	%	28.1%	ó	1.4%		0	.5%	7.9%		4.6%
SIMAP Modeling	bbl	86,3	47	42,13	6	2,067		,	790	11,808		6,864
Results			Spatial	Extent of 1	Exposu	ire over Thi	esho	old (Up	to 30 D	ays After Spil	ll)	
		(Volume				face (Area x						(Length)
		le Oil ng/l)	-	ssolved 01 mg/l)		cological 10 g/m²)		ocioeco (0.01 g		Ecological (100 g/m <sup>2</sup> )	l	Socioeconomic (1 g/m²)
	66,709			54 mil gal		mi <sup>2</sup> -days		78 mi <sup>2</sup> -		150 mi	,	157 mi
		<del>_</del>	Shoreli	ine Exposu	re by S	Shore Type	(Mil	es over	Ecolog	ical Threshold	1)	
	Be	drock	Ţ	Jnconsolid Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	artificial Shore
	22	.8 mi		98.4 mi		1.1	mi		1	13.4 mi		0 mi
Factoriant		Bracl	kish/Est	uarine We	tland I	Habitats Ex	pose	d (Mile	s over I	Ecological Thr	esho	old)
Ecological Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		nrub/Scrub and prested Wetland
2Aposures	(	) mi		0.1 mi		0 1	ni			0.5 mi		0 mi
		F								ogical Thresho		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		nrub/Scrub and prested Wetland
	1.	9 mi		9.8 mi		2.3	mi			0 mi		0.3 mi
						_		_	_	nse Operation		
Socioeconomic Impacts	beaches, j would be commerce and on the the river. Ewen Mil	of shoreli parks, and focused o ial propert e east shor Water inta le 89; Hyd	ne woul real esta n areas i y, and sl e from I akes that e Park M	d be oiled a ate would be more heavil horefront reduced to Hudson to Famus be affulle 80; Pool	above to affect affect of a state of the control of	he level of counted by oil, in (about 150) te would be beepsie. Addinclude: Ulst	once clud miles most tions er M ; Hig	rn for sing resing resing.  S). Rive affecte al impacible 96; lighland I	ocioecondue and rside pad on the cts may Rondout Mile 76;	odor. SCAT of rks, marinas, be west shore fro be experienced Mile 92; Rhin IBM Mile 72.	shore perate each om A l in o lebec	efront marinas, tions and cleanup es, industry, thens to Lloyd, ther towns along ek Mile 92; Port

#### Kingston 150,000-bbl Diluted Bitumen Spill (Winter-High Tide) Response

			]	Response Equipmen	t and Plan Activati	on		
	NCP and		Tier	Response Requiren	nents	GI	RPs/ GRS (7 d	Ss Activated ays)
	USCG Type	Tier 1 (24 I	hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail I	Miles	River Miles
	Major WCD	25,000 ft boo 1,000 ft + 30 skimming sy 1,875 bbl/day 3,750 bbl sto	0 per stem	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	n/	'a	35 river miles Mile 115-75 2016-28 to 2016-58
		Response Overview: Expected Outcomes and					3	
	Protective 1	Booming	Me	echanical Recovery	Shoreline Cle	anup	Oth	er Challenges
Spill Response <sup>13</sup>	An average cur velocity of 1 kt high currents w boom effective containment an diversionary be configurations to prevent entra splash over; ex- deflection conf be used to prote areas. Potential conditions may boom deploym	results in reducing ness, d com to be angled ninment and clusion and igurations to ect sensitive ice affect	veloci skim evap sprea amou recov mobi prop- up sh boom truck Poter may	rage 1 kt current cities may affect mer operations, 28% oration and rapid ading will reduce unt that can be vered mechanically; ilize floating self-elled skimmers; set noreline containment in areas with vacuum-areas with vacuum-areas with vacuum-areas simmers. Intial ice conditions affect skimmer ations.	flushing; some suremoval due to penetration on sabeaches; oiled do structures; oiled do removal.	ne. vetland ibstrate ndy ck	oil in hi areas es diluents wetland challeng wetland may cau potentia entrainr column to water kill con near spi dilution column bottom determin submerg bottom	al for submerged gh-sediment pecially as the evaporate; access may be ge; disturbance of s during response use effects; al for 1% ment in water which may lead intake and fish cerns in areas ll site prior to ; perform water tracking, perform drags to me extent of ged oil on river however at 1%, t be detectable.

<sup>&</sup>lt;sup>13</sup> Non-floating oil, therefore OSROs are required to be certified having capabilities as follows: detection; recovery; storage; and optional containment for submerged oil.

# Kingston 150,000-bbl Diluted Bitumen Spill (Winter-Low Tide) Effects

	Loca	tion	Se	ource	V	olume		Oil Ty	pe	Season		Tide Stage
Scenario Description	Propo Kings Ancho	ston	ATB	collision	150	),000 bbl	Dil	luted Bi	tumen	Winter		Low
Spill			l Proba	bility Any	where	in Hudson I	River	r				ual Frequency 2015)
Probability	Spi	ll of Type	(Any V	olume)	S	pill of Type	and	Volume	e	US		Hudson
,		0.73	32			0.000	0001	5		0		0
Conditions	Lat/			ase Rate	Da	Release te/Time		Model R Duratio		Winds		Water Temperature
Conditions	-73.9	.93017 5700		00 bbl/hr er 4 hrs		nuary 2016 9:00am		30 day	'S	Light / varial (<5 kts)	ble	32°F
				Mass Ba	lance a	at End of M	odel	Run (A	fter 30	Days)		
	Fate	Surfa	ace	Atmosph	nere	Water Column		Sed	iment	Ashore	;	Degraded
	%	57.8	%	28.1%		1.6%		0.	.4%	7.6%		4.6%
SIMAP Modeling	bbl	86,6	49	42,129	9	2,365		5	540	11,429		6,901
Results			Spatial	Extent of l	Exposi	ire over Thi	esho	old (Up	to 30 D	ays After Spil	ll)	
		· (Volume	•			face (Area x						(Length)
	Whol			ssolved 01 mg/l)		cological 10 g/m²)		ocioecor (0.01 g/		Ecological (100 g/m <sup>2</sup> )	<b>l</b> )	Socioeconomic (1 g/m²)
	70,968	mil gal	103,82	22 mil gal	182	mi2-days	18	82 mi2-	days	147 mi		153 mi
						Shore Type	(Mil	es over	Ecologi	cal Threshold	<b>l</b> )	
	Bee	drock	Ţ	Jnconsolida Rock	ated	Sand 1	Beac	ch	Mud	or Timber	A	Artificial Shore
	22	.6 mi		95.7 mi		1.4	mi		1	2.5 mi		0 mi
Ecological		Bracl				<del>-</del>				cological Thr		
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		agmites etland		nrub/Scrub and prested Wetland
Laposures	(	) mi		0 mi		0 1				0 mi		0 mi
		F								gical Thresho		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		tidal		ragmites Tetland		hrub/Scrub and brested Wetland
	1.	9 mi		10 mi		2.2	mi			0 mi		0.3 mi
						_		_	_	nse Operation		
Socioeconomic Impacts	153 miles beaches, j would be commerce Newburgh towns alo Mile 92; l Danskam	of shorelic parks, and focused of ial propert h, and on to ng the rive Port Ewen mer Mile (	real esta n areas i y, and si he east ser. Wate Mile 89	Id be oiled a ate would b more heavil horefront re shore from r intakes th b; Hyde Par	above to affect y oiled eat estandate may k Mile for the following the f	he level of coted by oil, in (about 147) te would be antown to Be affected in 80; Poughketton Mile 65.	once clud miles most acon nclu eepsi	rn for so ing resions). River affected Additional. Ulst e Mile 7	ocioecordue and rside particle on the onal imper Mile 17; High	nomic effects; sodor. SCAT of ks, marinas, b west shore fro pacts may be e	shore perate each om Sa xper Mile !	augerties to ienced in other 92; Rhinebeck Mile 72;

### Kingston 150,000-bbl Diluted Bitumen Spill (Winter-Low Tide) Response

			R	esponse Equipment	and Plan Activatio	n		
	NCP and		Tier	Response Requiren	nents	G		Ss Activated ays)
	USCG Type	Tier 1 (24	hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major WCD	25,000 ft bo 1,000 ft + 30 skimming s 1,875 bbl/da 3,750 bbl st	00 per ystem ay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	n/a		38 river miles Mile 103-65 2016-38 to 2016-65
		Re	sponse	Overview: Expecte	ed Outcomes and Cl	nallenges	5	
	Protective B	ooming	Mec	hanical Recovery	Shoreline Clea	nup	Othe	er Challenges
Spill Response <sup>14</sup>	An average curre velocity of 1 kt r high currents we boom effectivenes containment and diversionary book configurations to prevent entraisplash over; excludeflection configurations to be used to protect areas. Potential is conditions may a boom deployment.	results in reducing ess, om o be angled nment and dusion and gurations to ct sensitive ce affect	velocii skimm evapor spread amour recove mobili propel up sho boom trucks Potent	ge 1 kt current ties may affect her operations, 28% ration and rapid ing will reduce ht that can be hered mechanically; tze floating self- led skimmers; set hereline containment hareas with vacuum- and skimmers. hial ice conditions ffect skimmer hions.	Approximately 6% impact on shorelin Perform SCAT; w flushing; some subtemoval due to penetration on san beaches; oiled doc structures; oiled de removal.	e. etland ostrate dy k	oil in his especial evaporal access in disturba during in cause effor 1% ewater collead to visible his kill near spil dilution; column bottom of determining submergibottom I	I for submerged gh-sediment areas ly as the diluents te; wetland may be challenge; nee of wetlands esponse may fects; potential entrainment in olumn which may water intake and concerns in areas Il site prior to a perform water tracking, perform drags to the extent of ged oil on river nowever at <2%, be detectable.

Non-floating oil, therefore OSROs are required to be certified having capabilities as follows: detection; recovery; storage; and optional containment for submerged oil.

### Rondout 75,421-bbl Bakken Crude Spill (ACP Scenario)

#### Rondout 75,421-bbl Bakken Crude Spill (Spring-High Tide) Effects

Scenario	Loca		So	ource	7	olume		Oil Ty	ype		Season		Tide Stage
Description	Off Ro Cre		Tank b	arge spill	75	,421 bbl	В	akken	crude		Spring		High
g		Annı	ıal Prob	ability Any	where	in Hudson	Rive	r					ual Frequency 2015)
Spill Probability	Spi	ill of Typ	e (Any	Volume)	S	pill of Type	and `	Volum	ie		US		Hudson
·		0.7	732			0.0	)12				0		0
Conditions	Lat/l		Relea	ase Rate	Da	Release nte/Time		Model Durat			Winds		Water Temperature
Conditions	41.9 -73.9	1833 6333	Insta	ntaneous		pril 2016 3:00am		30 da	ys	Sc	outh / moder (2-15 kts)	ate	48°F
				Mass B	alance	at End of M	Iode	Run (	(After 30	) D	ays)		
	Fate	Surf	ace	Atmospl	here	Water Column	1	Se	diment		Ashoro	9	Degraded
GD 5 A D	%	0.0	%	47.5%	б	19.1%		,	0.3%		2.9%		8.3%
SIMAP Modeling	bbl	2		35,79		14,416			243		2,187		6,226
Results		/ <b></b> -				sure over Th				Day			- · · · ·
	Water	r (Volum		ological ssolved		face (Area x cological			osed) onomic		Shore Ecological		(Length) Socioeconomic
	(1 n			01 mg/l)		10 g/m²)		(0.01 g			$\frac{\text{Ecologica}}{(100 \text{ g/m}^2)}$		$(1 \text{ g/m}^2)$
	479,385	mil gal	391,03	35 mil gal	31	mi <sup>2</sup> -days	3	32 mi <sup>2</sup> -	days		87 mi		123 mi
						Shore Type	e (Mi	les ove	er Ecolog	gica	l Threshol	d)	
	Bee	drock		Jnconsolida Rock	ated	Sand	Beac	h	Mud	or	Timber	A	rtificial Shore
	15	.9 mi		58.4 mi		0 1	mi			5.2	mi		0 mi
Ecological		Bra				Habitats Ex							
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		_	mites land		rub/Scrub and rested Wetland
Exposures	C	) mi		0.1 mi		0 1	mi			0.2	mi		0 mi
						bitats Expos							
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		_	mites land		rub/Scrub and rested Wetland
	C	) mi		5.8 mi		1.7				0 1			0.3 mi
						ic Impacts fi		-	-		=		
Socioeconomic Impacts	evacuatic populate the level affected heavily of real estat Rhinebed that may Poughke	ons and p d areas co of conce by oil, in oiled (abo te would be affect epsie Mil	recaution ould cause rn for so cluding to the total total total total total recause re	nary clearar se effects or cioeconomi residue and les). Rivers affected on . Additional de: Rondou ghland Mile	nce zor n comr ic effect odor. S ide par the we l impact t Mile e 76; II	nes might cau nunities and l tts; shorefron SCAT operat- ks, marinas, st shore fron ts may be ex 92; Rhinebec	se fu busin t man ions beac h Kin perie k Mi Dans	rther in tesses. rinas, be and cle hes, in gston tenced in the general skamm	mpacts to 123 mile eaches, j eanup wo dustry, c to Cornw n other to Port Ewe er Mile (	es o parl ould om vall, own en M	ssel traffic. f shoreline vas, and real be focused mercial propand on the salong the Mile 89; HydChelsea Mil	Evac would estate on an perty, east s river. de Pa le 66;	d be oiled above e would be reas more and shorefront shore from . Water intakes rk Mile 80; ; Roseton Mile

### Rondout 75,421-bbl Bakken Crude Spill (Spring-High Tide) Response

			R	esponse Equipment	and Plan Activation	n			
	NCP and		Tier	Response Requiren	nents	G		Ss Activated ays)	
	USCG Type	Tier 1 (2	24 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles	
	Major MMPD-WCD	25,000 ft t 1,000 ft + skimming 1,875 bbl/ 3,750 bbl s	300 per system day	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	1	n/a	30 river miles Mile 90-60 2016-47 to 2016-69	
		Response Overview: Expe			ed Outcomes and Cl	nallenge	S		
	Protective Bo	oming	Mech	anical Recovery	Shoreline Clear	nup	Othe	er Challenges	
Spill Response	Protective Booming Average river currents of 1 kt will reduce boom			aporation and areading will amount that can be end mechanically; e floating selfed skimmers; set eline containment areas with vacuumnd skimmers.	About 3% is anticip to cause shoreline contamination. Perf SCAT; wetland flus some substrate rem due to penetration of sandy beaches; oiled structures; oiled del removal.	form shing; oval on d dock	Bakken s significa high ben area arou Potential oil in hig areas; we be challe of wetlar response effects; pentrainm water co- water int concerns	nt danger, as are zene vapors in and the spill. for submerged the sediment etland access may enge; disturbance and during may cause cotential for ent of 19% in lumn leading to ake and fish kill; perform water racking, and air	

### Rondout 75,421-bbl Bakken Crude Spill (Spring-Low Tide) Effects

Scenario	Loca	tion	So	ource	7	olume		Oil Ty	pe	Season		Tide Stage
Description	Off Ro Cre		Tank b	oarge spill	75	,421 bbl	В	akken c	crude	Spring		Low
Cm:11		Annu	ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Spill Probability	Spi	ill of Typ	e (Any '	Volume)	S	pill of Type	and `	Volum	e	US		Hudson
		0.7	732			0.0	)12			0		0
Conditions	Lat/		Relea	ase Rate	Da	Release ate/Time		Model l Durati		Winds		Water Temperature
	41.9 -73.9	1833 6333	Insta	ntaneous	3	pril 2016 3:00am		30 da		South / mode (2-15 kts)		48°F
				Mass B	alance	at End of M	Iodel	Run (	After 30	Days)		1
	Fate	Surf	ace	Atmospl		Water Column	l	Sec	diment	Ashor	e	Degraded
CIMAR	%	0.0		38.6%		24.1%		(	0.3%	2.4%		11.3%
SIMAP Modeling	bbl	0		29,09		18,178			211	1,819		8,551
Results									1	Days After Sp		
		r (Volum		ological ssolved		face (Area x	•	s Expo	-	Shore Ecologica		(Length) Socioeconomic
	(1 n	le Oil ng/l)		ssorvea 01 mg/l)		cological 10 g/m²)		(0.01 g		(100 g/m <sup>2</sup>		(1 g/m <sup>2</sup> )
	536,573	mil gal	520,13	33 mil gal	20	mi <sup>2</sup> -days	2	21 mi <sup>2</sup> -c	days	82 mi		116 mi
						Shore Type	(Mi	les ove	r Ecolog	ical Threshol	d)	
	Be	drock	Ţ	Jnconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	Artificial Shore
	14	.5 mi		53.6 mi		0.1				5.9 mi		0 mi
Ecological		Bra								Ecological Th		
Shoreline Exposures	Salt	marsh	L L	pper Inter Mix	tidal	Lower In		idal		ragmites /etland		nrub/Scrub and prested Wetland
2Aposures	0.	1 mi		0 mi		0 1	ni			0 mi		0 mi
										ogical Thresh		- 10
	Catta	il Marsh	ι	pper Inter Mix	tidal	Lower II		idal		ragmites /etland		hrub/Scrub and prested Wetland
	0.	1 mi		5.9 mi		1.6				0 mi		0.2 mi
	<b>D</b>					-		-	-	onse Operatio		
Socioeconomic Impacts	evacuation populate the level affected heavily or real estat Rhineber that may Poughke	ons and p d areas co of conce by oil, in oiled (abo te would l be affect epsie Mil	recaution ould cause rn for so cluding to the total total total total total recause re	nary clearar se effects or cioeconomi residue and iles). Rivers affected on . Additional de: Rondou ghland Mile	nce zon n comm ic effect odor. St ide par the we l impact t Mile e 76; II	es might cau nunities and l ts; shorefron SCAT operations, marinas, st shore from ts may be ex 92; Rhinebects BM Mile 72;	se fubusint mar tons abeach Kin perie k Mi	rther in lesses. rinas, be and clea hes, inc gston to nced in ile 92; I	npacts to 116 mile eaches, panup wo dustry, co o Cornw o other to Port Ewe er Mile 6	vessel traffic. s of shoreline barks, and real uld be focused ommercial pro all, and on the wns along the n Mile 89; Hy	Evac would estate I on a perty east river de Pa	d be oiled above e would be reas more , and shorefront shore from : Water intakes ark Mile 80; ; Roseton Mile

### Rondout 75,421-bbl Bakken Crude Spill (Spring-Low Tide) Response

			]	Response Equipmen	t and Plan Activati	on		
	NCP and		Tier	Response Requiren	nents	G]		Ss Activated ays)
	USCG Type	Tier 1 (2	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major MMPD- WCD	25,000 ft b 1,000 ft + 2 skimming 1,875 bbl/c 3,750 bbl s	300 per system day storage	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage		/a	30 river miles Mile 90-60 2016-47 to 2016-69
				e Overview: Expect	1		1	~ · ·
	Protective B			hanical Recovery	Shoreline Clea	-	Other Challenges	
Spill Response	Average river of 1 kt will reduce effectiveness, containment and diversionary be configurations angled to preve entrainment and over; exclusion deflection confit to be used to prisensitive areas.	e boom  ad  com  to be  ent  d splash  and  igurations  rotect	rapid s reduce recove mobili propel up sho boom	vaporation and spreading will amount that can be ared mechanically; ze floating self-led skimmers; set areline containment areas with vacuumand skimmers.	About <3% is anti to cause shoreline contamination. Pe SCAT; wetland fit some substrate rer due to penetration sandy beaches; oil structures; oiled d removal.	rform ushing; noval on ed dock	Bakken significa high ber area aro Potentia oil in hig areas; w be challed of wetla response effects; entrainn water co water in concern	bility during a spill is a unt danger, as are nzene vapors in und the spill. I for submerged gh-sediment etland access may enge; disturbance nds during e may cause potential for nent of 24% in olumn leading to take and fish kill s; perform water tracking, and air

## Rondout 75,421-bbl Bakken Crude Spill (Summer-High Tide) Effects

Scenario	Loca	tion	So	ource	7	olume		Oil Ty	pe	Season		Tide Stage	
Description	Off Ro Cre		Tank b	arge spill	75	,421 bbl	В	akken o	crude	Summer		High	
Spill		Annı	al Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)	
Probability	Spi	ill of Typ	e (Any '	Volume)	S	pill of Type	and `	Volum	e	US		Hudson	
		0.7	32			0.0	)12			0		0	
Conditions	Lat/l		Relea	ase Rate	Da	Release ate/Time		Model I Durati		Winds		Water Temperature	
Conditions	41.9 -73.9	1833 6333	Insta	ntaneous		1gust 2016 0:00am		30 da	ys	Light / varia (<5 kts)	ible	75°F	
				Mass B	alance	at End of M	Iode	Run (	After 30	Days)			
	Fate	Surf	ace	Atmospl	here	Water Column	ı	Sec	diment	Ashore	e	Degraded	
	%	0.1	%	52.8%	ó	37.3%		(	0.1%	6.6%		3.1%	
SIMAP Modeling	bbl	10	9	39,78	7	28,165			90	4,942		2,327	
Results			Spatia	al Extent of	Expo	sure over Th	resh	old (U	p to 30 E	ays After Spi	ill)		
		r (Volum	•			face (Area x						(Length)	
	Whol (1 n			ssolved 01 mg/l)		cological 10 g/m²)		cioeco (0.01 g	nomic g/m²)	Ecologica (100 g/m <sup>2</sup>		Socioeconomic (1 g/m²)	
	170,510	mil gal	72,84	72,848 mil gal 228 mi²-days 229 mi²-days						89 mi 108 mi			
			Shore	eline Expos	ne Exposure by Shore Type (Miles over Eco					ical Threshol	d)		
	Bee	drock	Ţ	Jnconsolida Rock	ated	Sand I	Beac	h	Mud	or Timber	A	artificial Shore	
	15	.6 mi		39.7 mi	2.2 mi			1	5.2 mi		0 mi		
Ecological		Bra								Ecological Th			
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower II		idal		agmites etland		nrub/Scrub and prested Wetland	
Enposures	(	) mi		0 mi		0 1	mi			0 mi		0 mi	
										ogical Thresh			
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower II		idal		agmites etland		nrub/Scrub and orested Wetland	
	2.	9 mi		11.5 mi		1.7				0.2 mi		0.3 mi	
										nse Operatio			
Socioeconomic Impacts	evacuatic populate the level affected heavily of real estat Poughke affected Poughke	ons and p d areas co of conce by oil, in biled (abo te would epsie. Ad include: l epsie Mil	recaution ould cause ould cause on for so cluding sut 89 minut 89 minut additional Rondout e 77; Hi	nary clearar se effects on cioeconomi residue and cles). Rivers affected on impacts ma Mile 92; R	nce zon n commic effect odor. Stide partitle we the we ny be ex hinebe	nes might cau nunities and l tts; shorefron SCAT operations, ks, marinas, st shore from experienced in ck Mile 92; U	se fur busing transfer to man	rther in tesses. Finas, be and cle hes, income skill to be town or Mile 9	npacts to 108 miles eaches, p anup woo dustry, co Lloyd, an s along th 96; Port E	vessel traffic. s of shoreline varks, and real ald be focused immercial projud on the east ne river. Water Ewen Mile 89;	Evac would estate on a perty, shore intal Hyde	d be oiled above e would be	

## Rondout 75,421-bbl Bakken Crude Spill (Summer-High Tide) Response

			J	Response Equipmen	t and Plan Activati	on		
	NCP and			Response Requiren				s Activated ays)
	USCG Type	Tier 1 (2	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major MMPD- WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/d 3,750 bbl s	300 per system lay storage	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage		/a	38 river miles Mile 113-75 2016-30 to 2016-58
				e Overview: Expect	1			
	Protective B			hanical Recovery	Shoreline Clea	-		er Challenges
Spill Response	Average river of 1 kt will reduce effectiveness, containment and diversionary be configurations angled to preve entrainment and over; exclusion deflection confito be used to presensitive areas.	e boom  d  oom  to be  nt d splash  and igurations	rapid s reduce recove mobili propel up sho boom	vaporation and spreading will amount that can be tred mechanically; ze floating self-led skimmers; set treline containment areas with vacuumand skimmers.	About <7% is anti to cause shoreline contamination. Pe SCAT; wetland flu some substrate rer due to penetration sandy beaches; oil structures; oiled de removal.	rform ushing; noval on ed dock	Bakken significa high ber area aro Potentia oil in hig areas; w be challed of wetla response effects; entrainn water co water in concerns	bility during a spill is a unt danger, as are azene vapors in und the spill. I for submerged gh-sediment etland access may enge; disturbance ands during a may cause potential for ment of 37% in olumn leading to take and fish kill s; perform water tracking, and air

# Rondout 75,421-bbl Bakken Crude Spill (Summer-Low Tide) Effects

Scenario	Loca	tion	So	ource	7	olume		Oil Ty	pe	Season		Tide Stage	
Description	Off Ro Cre		Tank b	arge spill	75	,421 bbl	В	akken c	crude	Summer		Low	
Spill		Annı	ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)	
Probability	Spi	ill of Typ	e (Any \	Volume)	$\mathbf{S}_{]}$	pill of Type	and '	Volume	e	US		Hudson	
		0.7	732			0.0	12			0		0	
Conditions	Lat/		Relea	ase Rate	Da	Release nte/Time		Aodel I Durati		Winds		Water Temperature	
Conditions	41.91 -73.9		Instai	ntaneous		ugust 2016 0:00am		30 day		Light / varia (<5 kts)	ble	75°F	
				Mass B	alance	at End of M	lodel	Run (	After 30	Days)		<b>T</b>	
	Fate	Surf	ace	Atmospl	nere	Water Column		Sec	diment	Ashore	e	Degraded	
a== = 1 =	%	0.1	%	52.7%	ó	37.4%		C	).1%	6.5%		3.2%	
SIMAP Modeling	bbl	6:	5	39,74	8	28,239			55	4,922		2,392	
Results			Spatia	l Extent of	Expos	sure over Th	resh	old (U <sub>]</sub>	p to 30 E	ays After Spi	ill)		
		r (Volum				face (Area x	•					(Length)	
	Whol	le Oil 1g/l)		ssolved 01 mg/l)	cological 10 g/m²)		cioeco (0.01 g		Ecologica (100 g/m <sup>2</sup> )		Socioeconomic (1 g/m <sup>2</sup> )		
	173,294	mil gal	75,44	5,446 mil gal 224 mi <sup>2</sup> -days 224 mi <sup>2</sup> -days						s 95 mi 117 mi			
				line Exposure by Shore Type (Miles over Eco					r Ecolog	ical Threshol	d)		
	Be	drock	Ţ	Jnconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	Artificial Shore	
	1	5 mi		42.2 mi					1	8.8 mi		0 mi	
Ecological		Bra								Ecological Th			
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower II		idal		agmites etland		nrub/Scrub and prested Wetland	
2Mposures	(	) mi		0 mi		0 1	ni			0 mi		0 mi	
										ogical Thresh			
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower II		idal		agmites etland		nrub/Scrub and prested Wetland	
	3.	1 mi		11.8 mi		2 1				0.2 mi		0.3 mi	
	-									nse Operatio			
Socioeconomic Impacts	evacuation populate the level affected heavily or real estat to Pough be affect 80; Poug	ons and p d areas co of conce by oil, in oiled (abo te would akeepsie. ed includ thkeepsie	recaution ould cause rn for so cluding a put 95 mi be most a Addition e: Ulster Mile 77	nary clearar se effects or cioeconomi residue and cles). Rivers affected on nal impacts Mile 96; R	nce zon n comm c effect odor. St ide part the we may be ondour Mile 70	nes might cau nunities and l tts; shorefron SCAT operati- ks, marinas, st shore from e experienced t Mile 92; Rh 6; IBM Mile	se fu busin t mar lons a beach Ath in o	rther in lesses. I rinas, be and clea hes, ind ens to I ther tow eck Mil	npacts to 117 miles eaches, p anup woo lustry, co Lloyd, an wns along le 92; Po	vessel traffic. s of shoreline varks, and real ald be focused mmercial proj d on the east s the river. Wa the Ewen Mile 8	Evac would estate on a perty shore ater in 89; H	d be oiled above e would be	

# Rondout 75,421-bbl Bakken Crude Spill (Summer-Low Tide) Response

			R	esponse Equipment	and Plan Activation	n			
	NCP and			Response Requirer				Ss Activated ays)	
	USCG Type	Tier 1 (2	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles	
	Major MMPD-WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/c 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	r	n/a	45 river miles Mile 120-75 2016-25 to 2016-58	
		R	esponse	Overview: Expecte	ed Outcomes and Cl	nallenge	s		
	Protective Bo	oming	Mech	anical Recovery	Shoreline Clear	nup	Other Challenges		
Spill Response	Average river cu 1 kt will reduce l effectiveness, containment and diversionary boo configurations to angled to preven entrainment and over; exclusion a deflection config to be used to pro sensitive areas.	om  be be t splash and gurations	rapid sp reduce a recovered mobilized propelled up shored boom an	aporation and reading will amount that can be ed mechanically; e floating selfed skimmers; set eline containment reas with vacuumnd skimmers.	About <7% is antic to cause shoreline contamination. Perf SCAT; wetland flus some substrate remdue to penetration candy beaches; oile structures; oiled det removal.	Form shing; oval on d dock	Bakken s significa high ben area arou Potential oil in hig areas; we be challe of wetlar response effects; pentrainm water co water int concerns	ant danger, as are zene vapors in and the spill.  for submerged ch-sediment etland access may enge; disturbance ads during may cause cotential for eent of 37% in lumn leading to ake and fish kill; perform water racking, and air	

## Rondout 75,421-bbl Bakken Crude Spill (Winter-High Tide) Effects

	_									~		m
Scenario	Loca		So	ource	'	olume		Oil Type	;	Season		Tide Stage
Description	Off Ro Cre		Tank b	arge spill	75	,421 bbl	В	akken cru	de	Winter		High
Spill		Annı	ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Probability	Spi	ill of Typ	e (Any \	Volume)	S	pill of Type a	and '	Volume		US		Hudson
		0.7	732			0.0	12			0		0
Conditions	Lat/l		Relea	se Rate	Da	Release nte/Time		Model Ru Duration	ı	Winds		Water Temperature
	41. -73.90	.91833 6333	Instai	ntaneous		ugust 2016 6:30am		30 days	]	Light / variat (<5 kts)	ole	75°F
				Mass B	alance	at End of M	lodel	Run (Af	ter 30 I	ays)		
	Fate	Surf	ace	Atmospl	nere	Water Column		Sedin	nent	Ashore	e	Degraded
	%	21.0	5%	51.1%	ó	10.6%		0.1	%	14.1%		2.5%
SIMAP Modeling	bbl	16,3	305	38,56	6	7,967		56	5	10,661		1,865
Results			Spatia	l Extent of	Expo	sure over Th	resh	old (Up t	o 30 Da	ys After Spi	ill)	
		r (Volum				face (Area x						(Length)
		le Oil		ssolved		cological 10 g/m²)		cioecono: (0.01 g/m		Ecological (100 g/m <sup>2</sup> )		Socioeconomic (1 g/m²)
	( <b>1 m</b> 129,155			<b>01 mg/l)</b> 0 mil gal		mi <sup>2</sup> -days		53 mi <sup>2</sup> -da		124 mi	,	139 mi
	125,100	IIII gui				Shore Type					d)	10, 111
	Bee	drock		Jnconsolida Rock		Sand 1				Timber		artificial Shore
	19	.9 mi		83 mi		0.6	mi		10	) mi		0 mi
		Bra	ckish/Es	stuarine W	etland	Habitats Ex	pose	ed (Miles	over Ec	ological Thi	resho	old)
Ecological Shoreline	Salt	marsh	U	pper Inter	tidal	Lower In		idal		gmites		rub/Scrub and
Exposures		) mi		Mix 0 mi		0 r				t <b>land</b> 3 mi	Fo	0 mi
	,		Eucahre		nd Hol			Ailes ever			~14)	O IIII
			T	pper Inter		bitats Expos Lower In				gmites		rub/Scrub and
	Catta	il Marsh		Mix	ııuaı	M		luai		tland		rested Wetland
	1	mi		7.3 mi		2 r	ni		0	mi		0.3 mi
	Potential Socioeconomic Impacts from Spill and Response Operations											
Socioeconomic Impacts	evacuation populate the level affected heavily or real estat Rhinebed may be a Mile 80;	ons and p d areas co of conce by oil, in biled (abo te would ck to Bea affected in Poughke	recaution buld cause rn for so cluding to but 124 n be most se con. Add aclude: U epsie Mi	nary clearar se effects or cioeconomi residue and niles). River affected on ditional imp JIster Mile (	nce zorn n common c effect odor. S rside pa the we bacts m 96; Rouland M	nes might cau nunities and l tts; shorefron SCAT operati arks, marinas st shore from ay be experie andout Mile 9 lile 76; IBM	se fu busin t mar ions a , bea uUlst enced 2; Rh	rther impa lesses. 139 linas, beac and cleant ches, indu- ter to New I in other to inebeck M 72; Dans	acts to very miles of the color	essel traffic. of shoreline velos, and real d be focused mmercial pro and on the ea ong the river Port Ewen M Mile 66; Ch	Evac would estate on a opert ast sh wile a Mile a	d be oiled above e would be reas more y, and shorefront ore from ter intakes that 89; Hyde Park

## Rondout 75,421-bbl Bakken Crude Spill (Winter-High Tide) Response

			R	esponse Equipment	and Plan Activatio	n		
	NCP and		Tier	Response Requirer	nents	G		Ss Activated ays)
	USCG Type	Tier 1 (	24 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major MMPD-WCD	25,000 ft 1,000 ft + skimming 1,875 bbl 3,750 bbl	300 per system day	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	1	n/a	28 river miles Mile 93-65 2016-45 to 2016-65
		J	Response	Overview: Expecte	ed Outcomes and Cl	hallenge	s	
	Protective Bo	oming	Mech	anical Recovery	Shoreline Clear	nup	Othe	er Challenges
Spill Response	Average river cu 1 kt will reduce l effectiveness, containment and diversionary boo configurations to angled to preven entrainment and over; exclusion a deflection config to be used to pro sensitive areas. F ice conditions m boom deploymen	om  be be t splash and gurations tect Potential ay affect	rapid spreduce a recover mobiliz propelle up short boom at trucks a potentia	aporation and breading will amount that can be ed mechanically; e floating selfed skimmers; set elline containment reas with vacuum-nd skimmers; al ice conditions eect skimmer ons.	About 14% is antic to cause shoreline contamination. Per SCAT; wetland flus some substrate rem due to penetration of sandy beaches; oiled structures; oiled de removal.	form shing; oval on ed dock	Bakken significa high ben area arou Potential oil in hig areas; we be challed of wetlar response effects; pentrainm water co water into concerns areas neat to dilution	ant danger, as are zene vapors in and the spill. If or submerged the sediment etland access may enge; disturbance and during may cause potential for eent of 11% in lumn leading to ake and fish kill especially in ar the spill prior on; perform water racking, and air

# Rondout 75,421-bbl Bakken Crude Spill (Winter-Low Tide) Effects

Scenario	Loca	tion	So	ource	7	olume		Oil Ty	pe	Season		Tide Stage
Description	Off Ro Cre		Tank b	arge spill	75	,421 bbl	В	akken c	crude	Winter		Low
Spill		Annı	ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Probability	Spi	ill of Typ	e (Any `	Volume)	S	pill of Type	and '	Volum	e	US		Hudson
		0.7	732			0.0	)12			0		0
Conditions	Lat/		Relea	ase Rate	Da	Release ate/Time		Model l Durati		Winds		Water Temperature
	41.91 -73.9		Insta	ntaneous		nuary 2016 9:00am		30 day		Light / variat (<5 kts)	ole	32°F
				Mass B	alance	at End of M	Iodel	Run (	After 30	Days)		
	Fate	Surf	ace	Atmospl	here	Water Column		Sec	liment	Ashore	e	Degraded
	%	21.2	2%	51.1%	ó	10.8%		(	0.1%	14.3%		2.5%
SIMAP Modeling	bbl	15,9	969	38,55	2				58	10,802	2	1,874
Results			Spatia	l Extent of	Expos	sure over Th	resh	old (U	p to 30 I	Days After Spi	ill)	
		r (Volum				face (Area x						(Length)
	Whol	le Oil ng/l)		ssolved 01 mg/l)		cological 10 g/m²)		cioeco: (0.01 g		Ecologica (100 g/m <sup>2</sup>		Socioeconomic (1 g/m²)
	123,916	mil gal	86,16	36,162 mil gal 333 mi <sup>2</sup> -days 349 mi <sup>2</sup> -days						124 mi	137 mi	
						Shore Type	(Mi	r Ecolog	ical Threshol	d)		
	Ве	drock	Ţ	Jnconsolida Rock	ated	Sand I	Beac	h	Mud	or Timber	A	artificial Shore
	19	.9 mi		82 mi	1.1 mi				1	0.2 mi		0 mi
Ecological		Bra								Ecological Th		
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites /etland		nrub/Scrub and prested Wetland
zarposur es	(	) mi		0 mi		0 1	ni			0 mi		0 mi
										ogical Thresh		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites /etland		nrub/Scrub and orested Wetland
	1	mi		7.6 mi		1.9				0 mi		0.3 mi
	_									onse Operatio		
Socioeconomic Impacts	evacuative populate the level affected heavily of real estate Hook to may be a Mile 80;	ons and p d areas co of conce by oil, in oiled (abo te would Poughke offected in	recaution ould cause rn for so cluding to the total transfer to the total recause reca	nary clearar se effects or cioeconomi residue and niles). River affected on Iditional im Jlster Mile	nce zon n comm ic effect odor. S rside pa the we npacts r 96; Ron lland M	nes might cau nunities and l ts; shorefron SCAT operations, marinas st shore from may be exper andout Mile 9 lile 76; IBM	se fu busin t mar ions a , bea u Ulst ience 2; Rh Mile	rther in lesses. inas, be and clesches, ir ter to Med in other inches. 72; Da	npacts to 137 mile eaches, p anup wo dustry, o Iarlboro, her town k Mile 9 unskamm	vessel traffic. s of shoreline varks, and real uld be focused commercial pro and on the eas s along the rive	Evac would estate on a opert st sho er. W Mile a	d be oiled above e would be reas more y, and shorefront ore from Red fater intakes that 89; Hyde Park a Mile 66.

## Rondout 75,421-bbl Bakken Crude Spill (Winter-Low Tide) Response

			R	esponse Equipment	and Plan Activatio	n		
	NCP and		Tier	Response Requirer	nents	G		Ss Activated ays)
	USCG Type	Tier 1 (	24 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major MMPD-WCD	25,000 ft 1,000 ft + skimming 1,875 bbl 3,750 bbl	300 per g system day	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	1	n/a	25 river miles Mile 95-70 2016-44 to 2016-62
		]	Response	Overview: Expecte	ed Outcomes and Cl	hallenge	s	
	Protective Bo	oming	Mech	anical Recovery	Shoreline Clean	nup	Othe	er Challenges
Spill Response	Average river cu 1 kt will reduce l effectiveness, containment and diversionary boo configurations to angled to preven entrainment and over; exclusion a deflection config to be used to pro sensitive areas. F ice conditions m boom deploymen	om  be be t splash and gurations tect Potential ay affect	rapid sp reduce a recovered mobilized propelled up shored boom an trucks a potentia	aporation and breading will amount that can be ed mechanically; e floating selfed skimmers; set eline containment reas with vacuumend skimmers; al ice conditions ect skimmer ons.	About 14% is antic to cause shoreline contamination. Per SCAT; wetland flu some substrate rem due to penetration a sandy beaches; oiled de removal.	form shing; oval on ed dock	Bakken s significa high ben area arou Potential oil in hig areas; we be challe of wetlar response effects; pentrainm water co- water int concerns areas nea prior to co- water co-	polity during a spill is a ant danger, as are zene vapors in and the spill.  for submerged ch-sediment etland access may range; disturbance ads during may cause potential for eent of 11% in lumn leading to ake and fish kill especially in ar the spill site dilution; perform lumn tracking, nonitoring.

#### Rondout 75,421-bbl Bakken Crude Spill with Fire/Explosion

Scenario	Location	Sour	rce	Volume	Oil Typ	e	Seas	on	Tide	
Description	Off Rondout Creek	Tank b spi		75,421 bbl	Bakken cr oil	ude	Sumr	ner	High	
Spill		An	nual P	robability			Histori	cal Annua (2000-20	al Frequency 015)	
Probability	Spill of Type	in Hudso	on	Spill Volume	e in Hudson	l	US	}	Hudson	
	0.7	32		0.0	12		0		0	
Conditions	Lat/Lon	Release	Rate	Release Date/Time	Run Dura	tion	Win		Temperature	
Conditions	41.91833 -73.96333	Instanta	neous	7 August 2016 0:00am	30 days		Light/va (<5 k	ts)	75°F	
Fire/Explosion	Pool Fire			Pool Fire		por (			Cloud Explosion	
<b>Probabilities</b>	Probability/In	cident		Probability	Explo		Incident	P	robability	
	0.08	_		0.0096		0.02			0.0029	
	Emergency			Evacuati				alth/Safet	-	
	This event may hat a spill on the water simultaneously.		re and	As an immediate measure, isolate s for at least 50 met all directions.	pill or leak a	rea t) in	irritate or bu	rn skin an	vith material may d eyes. ating, corrosive	
	Specific incident of the made early as the attack fire or allow	o whether	to	Large Spill  Consider initial	downwind		and/or toxic Vapors may	gases.		
	Port of Albany ha	s small		evacuation for at 1 (1000 feet).		ters	suffocation.  Light, sweet crude oils will normally			
	firefighting vessel a 1,500 gpm wate			Fire					s will normally able gasses such	
	unit may be insuf			• ISOLATE for 80	00 meters (1)				(unless these	
Fire/Explosion	potential size of the			mile) in all directi	ons; also,		gases have been removed). These			
Response 15	T	137 1		consider initial ev			flammable gasses can readily ignite if			
_	Kingston, Albany FD have NYS sur			meters (1/2 mile)	in all direction		released, when they come in contact with an ignition source. These crude			
	trailers w/monitor								hydrogen sulfide,	
	oil derailment fire	s but equi	pment						ard material. Due	
	and foam quantity								of crude oil, in an	
	insufficient for the spill/fire.	is larger ve	essel				accident scer product may		behavior of this	
	spin/inc.								r (sweet) crude	
	RP would be requ								he heavier (sour)	
	implement and me						crude oils.			
	Firefighting contr in order to provide	actor resou	urces				Air monitori	na should	be performed for	
	foam and equipme						responder ar			
	a potential large f							1		
	Flammable			In	npacts from	Fire	(Acres)			
	Distance	Tot	tal	Residential	Residential Commercia			strial	Public Use	
Cofoty Immosts	581 ft 0.8 acres			0 acres 0 acres			es 0.4 acre 0.4 acre			
Safety Impacts	Downwind			Impacts from Explosi			losion (Acres)			
	Distance	Tot	tal	Residential			Indu	strial	<b>Public Use</b>	
	2.19 miles	418 a	cres	155 acres	134 a	cres	50 a	cres	79 acres	
	ı	L		- I			es 50 acres 79 acres			

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<sup>&</sup>lt;sup>15</sup> If concurrent with a spill to the water, see also spill response tables. If there is a fire and/or explosion, some or even most of the oil may be consumed by the fire, reducing the amount of oil that would spill into the river and affect shorelines. In most cases, it would be necessary to conduct at least some oil spill cleanup in addition to fire-fighting, though those operations would be secondary to emergency fire-fighting operations.

<sup>81</sup> Hudson River Oil Spill Risk Assessment Volume 7: Spill Scenario Summaries

## Rondout 14,000-bbl Heavy Fuel Oil Spill (ACP Scenario)

## Rondout 14,000-bbl Heavy Fuel Oil Spill (Spring-High Tide) Effects

	_	_										
Scenario	Loca			ource	1	/olume		Oil Ty	pe	Season		Tide Stage
Description	Off Ro Cre		_	o vessel spill	14	,000 bbl	Не	eavy Fu	ıel Oil	Spring		High
Spill		Annı	ıal Prob	ability Any	where	in Hudson	Rive	er				ual Frequency 2015)
Probability	Spi	ll of Typ	e (Any `	Volume)	S	pill of Type	and	Volum	e	US		Hudson
		4.0	)73			0.0	)31			0		0
Conditions	Lat/l		Relea	ase Rate	Da	Release nte/Time		Model I Durati		Winds		Water Temperature
Conditions	41.91 -73.90		Insta	ntaneous		pril 2016 3:00am		30 da	ys	South / moder (2-15 kts)	rate	48°F
				Mass B	alance	at End of M	Iode	l Run (	After 30	Days)		_
	Fate	Surf	ace	Atmospl	nere	Water Column	l	Sec	diment	Ashore	e	Degraded
	%	1.8	%	5.7%	ı	0.0%		(	0.0%	70.3%		22.2%
SIMAP Modeling	bbl	24	8	802		0			0	9,836		3,112
Results			Spatia	al Extent of	Expo	sure over Th	resh	old (U	p to 30 I	Days After Spi	ill)	
		r (Volum				face (Area x						(Length)
	Whol			ssolved 01 mg/l)	(	cological 10 g/m²)		ocioeco (0.01 g	$g/m^2$ )	Ecological (100 g/m <sup>2</sup> )		Socioeconomic (1 g/m²)
	59 mi	l gal	1,918	3 mil gal	12	mi <sup>2</sup> -days	1	12 mi <sup>2</sup> -	days	113 mi		125 mi
						Shore Type	(Mi	iles ove	r Ecolog	gical Threshol	d)	
	Bee	drock	Ţ	Unconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	Artificial Shore
	18	.7 mi		77.8 mi		0 1				6.8 mi		0 mi
Ecological		Bra								Ecological Th		
Shoreline	Salt	marsh	'	pper Inter Mix	tidal	Lower In		adal		ragmites Vetland		hrub/Scrub and brested Wetland
Exposures	C	) mi		0 mi		0 r			<u> </u>	0 mi		0 mi
			Freshw	ater Wetla	nd Ha	bitats Expos	ed (I	Miles o	ver Ecol	ogical Thresh	old)	
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		nrub/Scrub and prested Wetland
	0.	4 mi		7 mi		2.1	mi			0 mi		0.3 mi
						_		_	_	onse Operatio		
Socioeconomic Impacts	125 mile beaches, would be commerc Windsor towns ale Ewen M	s of shore parks, an e focused cial prope , and on tong the ri ile 89; Hy Roseton	eline wo ad real es on areas erty, and he east s ver. War	uld be oiled state would s more heav shorefront is shore from I ter intakes t Mile 80; Pe	l above be affe ily oile real est Rhineb hat ma oughke	the level of a acted by oil, in ad (about 113 ate would be eck to Philips be affected depsie Mile 7	conc nclud mile mos stow incl 7; Hi	ern for ding res es). Riv st affect n. Addi ude: Ro ighland	socioeco sidue and erside pa red on the tional in ondout M Mile 76	l odor. SCAT of arks, marinas, the e west shore from a pacts may be of lile 92; Rhineb gray; ; Danskamme	shor opera oeach om K exper eck I er Mi	efront marinas, tions and cleanup nes, industry, Lingston to New rienced in other

# Rondout 14,000-bbl Heavy Fuel Oil Spill (Spring-High Tide) Response

			F	Response Equipment	t and Plan Activatio	n		
	NCP and		Tier	Response Requiren	nents	G		Ss Activated lays)
	USCG Type	Tier 1 (2	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/c 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	1	n/a	29 river miles Mile 92-63 2016-46 to 2016-67
		]	Respons	e Overview: Expect	ed Outcomes and Cl	hallenge	s	
	Protective B	Booming	Mecl	hanical Recovery	Shoreline Clean	nup	Othe	er Challenges
Spill Response	Average river of 1 kt will reduce effectiveness, containment and diversionary be configurations angled to preve entrainment and over; exclusion deflection confit to be used to presensitive areas.	e boom  d  com  to be  ent d splash and igurations rotect	the bul contam shoreli amoun recover mobiliz propell designe set up s contair	% evaporation with k of the spill hinating the ne will reduce t that can be red mechanically; ze floating self-led skimmers led for heavy oils; shoreline himent boom areas accum-trucks and	About 70% is antic to cause shoreline contamination and require significant shoreline cleanup or contaminated sedin and debris. Perform SCAT; wetland flus some substrate remulue to penetration or sandy beaches; oiled structures; oiled delayed.	will of nent, n shing; oval on ed dock	heavy oi significa Potential shorelind wetland challeng wetlands may caus potential of oil in	bility during a I spill is not a nt danger, for significant e cleanup, access may be e; disturbance of during response se effects; for entrainment water column not cant factor,
			skimm	ers.	structures; oiled debris removal.		a significant factor, responders need to wear disposable Tyvek coveralls.	

# Rondout 14,000-bbl Heavy Fuel Oil Spill (Spring-Low Tide) Effects

Scenario	Loca	tion	So	ource	7	olume		Oil Ty	ре	Season		Tide Stage
Description	Off Ro Cre			o vessel spill	14	,000 bbl	Не	avy Fu	iel Oil	Spring		Low
Spill		Annı	ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Probability	Spi	ill of Typ	e (Any \	Volume)	S	pill of Type	and	Volum	e	US		Hudson
		4.0	)73			0.0	)31			0		0
Conditions	Lat/l		Relea	ase Rate	Da	Release nte/Time		Model : Durat		Winds		Water Temperature
Conditions	41.91 -73.90		Insta	ntaneous	1	pril 2016 1:00am		30 da		South / mode (4-15 kts)		48°F
				Mass B	alance	at End of M	Iode	Run (	After 30	Days)		
	Fate	Surf	ace	Atmosph	nere	Water Column	l	Se	diment	Ashore	9	Degraded
	%	1.2	.%	5.7%		0.0%		(	0.0%	70.8%		22.2%
SIMAP Modeling	bbl	17	1	802	802 0 0					9,915		3,112
Results			Spatia	l Extent of	Expo	sure over Th	resh	old (U	p to 30 I	Days After Spi	ll)	
		r (Volum		ŭ		face (Area x						(Length)
	Whol (1 m			ssolved 01 mg/l)	(	cological 10 g/m²)		cioeco (0.01 g	nomic g/m²)	Ecological (100 g/m <sup>2</sup> )		Socioeconomic (1 g/m²)
	64 mi	l gal	1,272	2 mil gal	11	mi <sup>2</sup> -days	1	1 mi <sup>2</sup> -	days	115 mi		125 mi
						Shore Type	(Mi	les ove	r Ecolog	ical Threshol	d)	
	Bee	drock	Į	Jnconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	artificial Shore
	19	.4 mi		78.2 mi		0.1	mi		,	7.5 mi		0 mi
Ecological		Bra								Ecological Th		
Shoreline	Salt	marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites /etland		nrub/Scrub and prested Wetland
Exposures	0.	1 mi		0 mi		0 1			V 1	0 mi	10	0 mi
			Freshw	ater Wetla	nd Ha	bitats Expos	ed (N	Miles o	ver Ecol	ogical Thresh	old)	
	Cattai	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites /etland		nrub/Scrub and prested Wetland
	0.	4 mi		7.3 mi		2.2	mi			0 mi		0.3 mi
										onse Operatio		
	_	-	-	-	_	_		-	_	out river for at		-
												efront marinas, tions and cleanup
Socioeconomic	would be	focused	on areas	more heav	ily oile	ed (about 115	mile	es). Riv	erside pa	ırks, marinas, t	each	es, industry,
Impacts										west shore from		ingston to rienced in other
	towns alo	ong the ri	ver. Wat	ter intakes t	hat ma	y be affected	incl	ude: Ro	ondout M	ile 92; Rhineb	eck I	Mile 92; Port
												skammer Mile be instituted for
	much or			AOII IVIIIC U.	,, , tuul	onai precau		ar y 11511	ing auvis	orics would III	cciy	oc mstituted for

# Rondout 14,000-bbl Heavy Fuel Oil Spill (Spring-Low Tide) Response

			J	Response Equipmen	t and Plan Activati	on	-		
	NCP and		Tier	Response Requiren	nents	G]		Ss Activated ays)	
	USCG Type	Tier 1 (2	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles	
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/c 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	n	/a	23 river miles Mile 90-67 2016-47 to 2016-64	
		]	Respons	e Overview: Expect	ed Outcomes and C	Challenge	s		
	Protective B	Booming	Mec	hanical Recovery	Shoreline Clea	nup	Oth	er Challenges	
Spill Response	Average river of 1 kt will reduce		the bu	5% evaporation with lk of the spill	About 71% is anti to cause shoreline		heavy o	bility during a il spill is not a	
	effectiveness, containment an diversionary be configurations	oom to be	shoreli amour recove	ninating the ine will reduce at that can be ared mechanically;	contamination and require significant shoreline cleanup contaminated sedi	of ment,	Potentia shorelin wetland	ant danger,  Il for significant e cleanup, access may be	
	angled to preve entrainment and over; exclusion deflection conf	d splash and	propel design	ze floating self- led skimmers ed for heavy oils; shoreline	SCAT; wetland flu	SCAT; wetland flushing; some substrate removal n		ise effects;	
	to be used to pr	rotect	contain	nment boom areas	sandy beaches; oil	ed dock	ng; wetlands during responsal may cause effects; potential for entrainment of oil in water column		
	sensitive areas.		skimm	acuum-trucks and ers.	structures; oiled do removal.	eoris	respond	cant factor, ers need to wear ble Tyvek s.	

## Rondout 14,000-bbl Heavy Fuel Oil Spill (Summer-High Tide) Effects

Scenario	Loca	tion	So	ource	V	olume		Oil Ty	ре	Season		Tide Stage
Description	Off Ro Cre			o vessel spill	14	,000 bbl	Не	eavy Fu	ıel Oil	Summer		High
Spill		Annı	ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Probability	Spi	ill of Typ	e (Any `	Volume)	$S_{]}$	pill of Type	and `	Volum	e	US		Hudson
		4.0	)73			0.0	)31			0		0
Conditions	Lat/I		Relea	ase Rate	Da	Release te/Time		Model I Durati		Winds		Water Temperature
Conditions	41.91 -73.90		Insta	ntaneous		ıgust 2016 ):00am		30 day	ys	Light / varia (<5 kts)	ble	75°F
				Mass B	alance	at End of M	Iode	l Run (	After 30	Days)		
	Fate	Surf	ace	Atmospl	nere	Water Column	l	Sec	diment	Ashore	e	Degraded
	%	17.	1%	6.4%		0.0%		(	0.0%	54.4%		22.2%
SIMAP Modeling	bbl 2,395 891 0 2 7,609  Spatial Extent of Exposure over Threshold (Up to 30 Days After Spill)								3,102			
Results			Spatia	l Extent of	Expos	sure over Th	resh	old (U	p to 30 l	Days After Spi	ill)	
	Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (Length)									_		
	$ (1 \text{ mg/l}) \qquad (0.001 \text{ mg/l}) \qquad (10 \text{ g/m}^2) \qquad (0.01 \text{ g/m}^2) \qquad (100 \text{ g/m}^2) \qquad (1 \text{ g/m}^2) $									Socioeconomic (1 g/m²)		
	20 mi	il gal	11,13	1 mil gal	83	mi <sup>2</sup> -days	8	33 mi <sup>2</sup> -0	days	71 mi		73 mi
						Shore Type	(Mi	les ove	r Ecolog	gical Threshol	d)	
	Be	drock	Ţ	Jnconsolida Rock	ated	Sand l	Beac	h	Mud	or Timber	A	Artificial Shore
	14	.1 mi		32.3 mi		2.2	mi		1	0.7 mi		0 mi
Ecological		Bra								Ecological Th		
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites Vetland		hrub/Scrub and prested Wetland
Exposures	C	) mi		0 mi		0 1	mi			0 mi		0 mi
										ogical Thresh		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites Vetland		hrub/Scrub and prested Wetland
	2.	2 mi		8.5 mi		0.5	mi			0 mi		0.3 mi
	Potential Socioeconomic Impacts from Spill and Response Operations											
Socioeconomic Impacts	"oute of foreign of areas more nearly offer (about 11 miles). It foreign parts, marinas, oracles, measury,								nt marinas, tions and cleanup es, industry, augerties to ed in other towns ninebeck Mile 92;			

# Rondout 14,000-bbl Heavy Fuel Oil Spill (Summer-High Tide) Response

			]	Response Equipme	nt and Plan Activati	ion		
	NCP and		Tier	Response Require	nents	G		Ss Activated lays)
	USCG Type	Tier 1 (24	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/d 3,750 bbl s	300 per system lay		25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	n	/a	25 river miles Mile 103-78 2016-38 to 2016-56
		]	Respons	se Overview: Expec	ted Outcomes and O	Challenge	es	
	Protective B	Booming	Med	hanical Recovery	Shoreline Cle	anup	Oth	er Challenges
Spill Response	Average river of 1 kt will reduce effectiveness, containment an diversionary be configurations	e boom  id  boom  to be	the bu contar shorel amount recove	5% evaporation with lk of the spill minating the ine will reduce at that can be ered mechanically	to cause shoreline contamination and require significant shoreline cleanup contaminated sedi	d will t of iment,	heavy or significa Potentia shorelin wetland	bility during a il spill is not a ant danger, il for significant e cleanup, access may be
	angled to preve entrainment an over; exclusion deflection conf to be used to pr sensitive areas.	d splash and igurations otect	to rem surfac self-pi design set up contai	gh 17% is projected ain floating on e; mobilize floating copelled skimmers and for heavy oils; shoreline nment boom areas accuum-trucks and	and debris. Perfor SCAT; wetland fl some substrate redue to penetration sandy beaches; oi structures; oiled d removal.	ushing; moval on led dock	challeng wetland may cau potentia of oil in a signifi respond	ge; disturbance of s during response use effects; I for entrainment water column not cant factor, ers need to wear ble Tyvek
			skimn				coverall	•

# Rondout 14,000-bbl Heavy Fuel Oil Spill (Summer-Low Tide) Effects

Scenario	Loca	tion	So	ource	7	Volume		Oil Ty	pe	Season		Tide Stage			
<b>Description</b>	Off Ro Cre			go vessel spill	14	1,000 bbl	Нє	avy Fu	el Oil						
Spill		Annı	ıal Prob	ability Any	where	e in Hudson	Rive	r				ual Frequency 2015)			
Probability Probability	Spi	ill of Typ	e (Any '	Volume)	S	pill of Type	and	Volum	e	US		Hudson			
		4.0	)73			0.0	)31			0		0			
Conditions	Lat/l		Relea	ase Rate	Da	Release ate/Time		Model I Durati		Winds		Water Temperature			
Conditions	41.91 -73.90		Insta	ntaneous		ugust 2016 5:30am		30 da	ıys	Light / varia (<5 kts)	ble	75°F			
				Mass B	alance	at End of M	Iode	l Run (	After 30	Days)					
	Fate	Surf	face	Atmospl	here	Water Column	1	Sec	diment	Ashore	e	Degraded			
	%	18.2	2%	6.4%	)	0.0%		(	0.0%	53.2%		22.2%			
SIMAP Modeling	bbl	2,5	53	894		0			2	7,448 3,1					
Results	Spatial Extent of Exposure over Threshold (Up to 30 Days After Spill)														
	Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (Length)														
	Whol (1 n	le Oil ng/l)		ssolved 01 mg/l)		cological 10 g/m²)		ocioeconomic Ecological Socioecon (0.01 g/m²) (100 g/m²) (1 g/m²)							
	14 mi	l gal	10,83	0 mil gal	84	mi <sup>2</sup> -days	8	34 mi <sup>2</sup> -	days	69 mi		72 mi			
						Shore Type	(Mi	les ove	r Ecolog	ical Threshol	d)				
	Bee	drock	Ţ	Unconsolida Rock	ated	Sand	Beac	h	Mud	or Timber	A	Artificial Shore			
	12	.9 mi		31.3 mi		2.2	mi		1	1.6 mi		0 mi			
Ecological		Bra								Ecological Th					
Shoreline	Salt	marsh	U	Jpper Inter Mix	tidal	Lower In		idal		agmites etland		hrub/Scrub and prested Wetland			
Exposures	0	) mi		0 mi		0 1			<u></u>	0 mi	10	0 mi			
			Freshw	ater Wetla	nd Ha	bitats Expos	ed (N	Miles o	ver Ecol	ogical Thresh	old)				
	Catta	il Marsh	U	Jpper Inter Mix	tidal	Lower In		idal		agmites etland		hrub/Scrub and orested Wetland			
	1.	7 mi		8.7 mi		0.5	mi			0 mi		0.3 mi			
	Potential Socioeconomic Impacts from Spill and Response Operations														
Socioeconomic Impacts	Response operations may cause major impacts to ports in Albany and throughout river for at least several days. miles of shoreline would be oiled above the level of concern for socioeconomic effects; shorefront marinas, beaches, parks, and real estate would be affected by oil, including residue and odor. SCAT operations and clear would be focused on areas more heavily oiled (about 69 miles). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate would be most affected on the west shore from Catskill to Esop and on the east shore from Hudson to Hyde Park. Additional impacts may be experienced in other towns along the river. Water intakes that may be affected include: Ulster Mile 96; Rondout Mile 92; Rhinebeck Mile 92; Po Ewen Mile 89; Hyde Park Mile 80; Poughkeepsie Mile 77; Highland Mile 76. Additional precautionary fishing advisories would likely be instituted for much or all of the river.								nt marinas, tions and cleanup es, industry, Catskill to Esopus, er towns along ck Mile 92; Port						

# Rondout 14,000-bbl Heavy Fuel Oil Spill (Summer-Low Tide) Response

			J	Response Equipmen	t and Plan Activati	on		
	NCP and		Tier	Response Requiren	nents	G		Ss Activated lays)
	USCG Type	Tier 1 (2	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/c 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	n	/a	30 river miles Mile 112-82 2016-31 to 2016-53
		]	Respons	se Overview: Expect	ted Outcomes and C	Challenge	es	
	Protective E	Booming	Mec	hanical Recovery	Shoreline Clea	nup	Oth	er Challenges
Spill Response	Average river of 1 kt will reduce			5% evaporation with lk of the spill	About 53% is anti to cause shoreline			bility during a il spill is not a
	effectiveness,			ninating the	contamination and			ant danger,
	containment an diversionary bo			ine will reduce nt that can be	require significant shoreline cleanup			ll for significant e cleanup,
	configurations	to be	recove	ered mechanically	contaminated sedi	ment,	wetland access may be	
	angled to preve entrainment an			gh 18% is projected ain floating on	and debris. Perform SCAT; wetland flu			ge; disturbance of s during response
	over; exclusion			e; mobilize floating	some substrate ren			ise effects;
	deflection conf			opelled skimmers	due to penetration			l for entrainment
	to be used to prosensitive areas.			ed for heavy oils; shoreline	sandy beaches; oil structures; oiled do			water column not cant factor,
	sonsitive dreas.		contain	nment boom areas acuum-trucks and	removal.		respond	ers need to wear ble Tyvek
			skimm	ners.			coverall	s.

# Rondout 14,000-bbl Heavy Fuel Oil Spill (Winter-High Tide) Effects

Scenario	Loca	tion	So	ource	7	Volume		Oil Ty	ре	Season		Tide Stage
Description	Off Ro Cre			o vessel spill	14	1,000 bbl	Нє	eavy Fu	ıel Oil	Winter		Low
Spill		Annı	ıal Prob	ability Any	where	e in Hudson	Rive	r				ual Frequency 2015)
Probability	Spi	ill of Typ	e (Any '	Volume)	S	pill of Type	and	Volum	e	US		Hudson
-		4.0	)73			0.0	)31			0		0
Conditions	Lat/l		Relea	ase Rate	Da	Release ate/Time		Model 1 Durat		Winds		Water Temperature
Conditions	41.91 -73.90		Insta	ntaneous		nuary 2016 3:00am		30 da	ys	Light / variab (<5 kts)	le	32°F
				Mass B	alance	at End of M	Iode	l Run (	After 30	Days)		
	Fate	Surf	face	Atmospl	here	Water Column	1	Sec	diment	Ashore	e	Degraded
	%	5.1	%	3.6%	)	0.0%		(	0.0%	68.9%		22.4%
SIMAP Modeling	bbl	71	.3	499		4			0	9,651	3,134	
Results	Spatial Extent of Exposure over Threshold (Up to 30 Days After Spill)											
	Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (Length)											
	Whol (1 n	le Oil ng/l)		ssolved 01 mg/l)	(	cological 10 g/m²)		(0.01 g		Ecologica (100 g/m <sup>2</sup> )		Socioeconomic (1 g/m²)
	663 m	il gal	624	mil gal	0.9	mi <sup>2</sup> -days	0	.9 mi <sup>2</sup> -	days	75 mi		78 mi
						Shore Type	(Mi	les ove	r Ecolog	cal Threshold)		
	Bee	drock	Ţ	Unconsolida Rock	ated	Sand	Beac	h	Mud	or Timber	A	Artificial Shore
	12	.1 mi		50 mi		0.5	mi		(	5.5 mi		0 mi
Ecological		Bra								Ecological Th		
Shoreline	Salt	marsh	U	Jpper Inter Mix	tidal	Lower I	ntert ix	idal		ragmites /etland		nrub/Scrub and prested Wetland
Exposures	0	) mi		0 mi		0 1			•	0 mi	10	0 mi
			Freshw	ater Wetla	nd Ha	bitats Expos	ed (N	Miles o	ver Ecol	ogical Thresh	old)	
	Catta	il Marsh	T	Jpper Inter Mix		Lower In	ntert		Ph	ragmites /etland	Sl	hrub/Scrub and prested Wetland
	0.	2 mi		3.8 mi		1.5	mi			0 mi		0.3 mi
	Potential Socioeconomic Impacts from Spill and Response Operations											
Socioeconomic Impacts	would be rocused on areas more nearity oned (about 15 miles). It verside parks, marmas, beaches, madsity,								nt marinas, tions and cleanup es, industry, Uster to perienced in Mile 92; tile 76; IBM Mile			

## Rondout 14,000-bbl Heavy Fuel Oil Spill (Winter-High Tide) Response

				· · · · · · · · · · · · · · · · · · ·	4 am J Dlam A atimatia			
	NCP and			Response Equipmen  Response Requiren	t and Plan Activationents			Ss Activated lays)
	USCG Type	Tier 1 (2	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/d 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	1	n/a	20 river miles Mile 93-73 2016-44 to 2016-59
				•	ed Outcomes and C	hallenge	S	
	Protective B	ooming	Mecl	hanical Recovery	Shoreline Clear	nup	Othe	er Challenges
Spill Response	Average river of 1 kt will reduce effectiveness, containment and diversionary be configurations angled to preve entrainment and over; exclusion deflection confit to be used to presensitive areas, ice conditions a boom deployment.	e boom  d  com  to be  ent  d splash  and  igurations  rotect  Potential  may affect	the bull contain shoreli amoun recove althoughto remains surface self-prodesigned set up contain with value skimm	% evaporation with k of the spill hinating the ne will reduce t that can be red mechanically gh 5% is projected ain floating on e; mobilize floating opelled skimmers ed for heavy oils; shoreline himent boom areas accum-trucks and ers; potential ice tons may affect	About 69% is antice to cause shoreline contamination and require significant shoreline cleanup of contaminated sedin and debris. Perform SCAT; wetland flu some substrate remulue to penetration of sandy beaches; oiled structures; oiled de removal.	will of ment, n shing; noval on ed dock	heavy oi significa Potentia shorelind wetland challeng wetlands may cau potential of oil in a significa responde	bility during a I spill is not a nt danger, I for significant e cleanup, access may be e; disturbance of s during response se effects; I for entrainment water column not cant factor, ers need to wear ole Tyvek s.

## Rondout 14,000-bbl Heavy Fuel Oil Spill (Winter-Low Tide) Effects

Scenario	Loca	tion	So	ource	7	Volume		Oil Ty	pe	Season		Tide Stage				
<b>Description</b>	Off Ro Cre		_	o vessel spill	14	1,000 bbl	Нє	avy Fu	el Oil	Winter Low  Historical Annual Frequency						
Spill		Annı	ıal Prob	ability Any	where	e in Hudson	Rive	r				ual Frequency 2015)				
Probability	Spi	ill of Typ	e (Any '	Volume)	S	pill of Type	and	Volum	e	US		Hudson				
-		4.0	)73			0.0	)31			0		0				
Conditions	Lat/l		Relea	ase Rate	Da	Release ate/Time		Model l Durati		Winds		Water Temperature				
Conditions	41.91 -73.90		Insta	ntaneous		nuary 2016 9:00am		30 day	<u> </u>	Light / variat (<5 kts)	ole	32°F				
				Mass B	alance	at End of M	Iode	l Run (	After 30	Days)						
	Fate	Surf	ace	Atmosph	here	Water Column	1	Sec	diment	Ashore	e	Degraded				
	%	4.8	%	3.6%	ı	0.0%		(	0.0%	69.2%		22.4%				
SIMAP Modeling	bbl	66	57	504		2			2	9,692 3,1						
Results	Spatial Extent of Exposure over Threshold (Up to 30 Days After Spill)															
	Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (Length)															
	Whol (1 n	le Oil ng/l)		ssolved 01 mg/l)		cological 10 g/m²)		ocioeco (0.01 g		Ecological Socioecono (100 g/m²) (1 g/m²						
	538 m	il gal	539	mil gal	0.9	mi <sup>2</sup> -days	0	.9 mi <sup>2</sup> -	days	75 mi		79 mi				
						Shore Type	(Mi	les ove	r Ecolog	ical Threshol	d)					
	Bee	drock	Ţ	Jnconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	Artificial Shore				
	12	2.3 mi		48.7 mi		1 1	mi		,	7.4 mi		0 mi				
Ecological		Bra								Ecological Th						
Shoreline	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites /etland		hrub/Scrub and prested Wetland				
Exposures	0	) mi		0 mi		0 1			•	0 mi	- \	0 mi				
			Freshw	ater Wetla	nd Ha	bitats Expos	ed (N	Miles o	ver Ecol	ogical Thresh	old)					
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites /etland		hrub/Scrub and orested Wetland				
	0.	.3 mi		3.9 mi		1.5	mi			0 mi		0.3 mi				
	Potential Socioeconomic Impacts from Spill and Response Operations															
Socioeconomic Impacts	would be locased on areas more nearly oned (about 15 mines). In verside parks, marinas, seaches, madsiry,								nt marinas, tions and cleanup es, industry, Ulster to Lloyd, n other towns ninebeck Mile 92;							

## Rondout 14,000-bbl Heavy Fuel Oil Spill (Winter-Low Tide) Response

			]	Response Equipmen	t and Plan Activati	on		
	NCP and		Tier	Response Requiren	nents	G]		Ss Activated ays)
	USCG Type	Tier 1 (24	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail 1	Miles	River Miles
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/d 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	n.	/a	20 river miles Mile 95-75 2016-43 to 2016-58
				e Overview: Expect		Challenge	S	
	Protective B	Booming	Mec	hanical Recovery	Shoreline Clea	nup	Oth	er Challenges
Spill Response	Average river of 1 kt will reduce effectiveness, containment and diversionary be configurations angled to preve entrainment and over; exclusion deflection confit to be used to presensitive areas, ice conditions reduced by the	e boom  d  com  to be  ent d splash and igurations rotect Potential may affect	the bulcontant shoreli amour recover althout to rem surface self-pridesign set up contain with viskimm conditions.	we evaporation with the of the spill initiating the time will reduce at that can be tred mechanically gh 5% is projected ain floating on the experience of the event of the ev	About 69% is anti to cause shoreline contamination and require significant shoreline cleanup contaminated sedi and debris. Perfor SCAT; wetland flusome substrate rer due to penetration sandy beaches; oil structures; oiled deremoval.	of ment, m ushing; noval on ed dock	heavy o significa Potentia shorelin wetland challeng wetland may cau potentia of oil in a signifi respond	bility during a all spill is not a ant danger, all for significant e cleanup, access may be ge; disturbance of s during response ase effects; all for entrainment water column not cant factor, ers need to wear ole Tyvek s.

#### Newburgh Waterfront Crude-by-Rail 11,000-bbl Bakken Crude Spill

Newburgh CBR 11,000-bbl Bakken Crude Spill (Spring-High Tide) Effects

	Loca	tion	Sc	ource	V	olume		Oil Ty	me	Season		Tide Stage
Scenario Description	Newb											_
Description	Water		CBR	rain spill	11	,000 bbl	Ва	ıkken (	crude	Spring		High
Spill		Annu	al Prob	ability Any	where	in Hudson	Rive	er				ual Frequency 2015)
Probability	Spi	ll of Typ	e (Any `	Volume)	$S_1$	pill of Type	and	Volun	ne	US		Hudson
·		0.000	00046			0.000	0003	5		0.2		0
	Lat/	Lon	Relea	se Rate		Release te/Time		Iodel I Durati		Winds		Water Temperature
Conditions	41.51 -74.00 41.50 -74.00	0694 0517	Instai	ntaneous	1 A	pril 2016 5:00pm		30 da		Light / varia (<5 kts)	ble	43°F
				Mass Ba	alance	at End of M	Iodel	Run	(After 3	0 Days)		
	Fate	Surf	ace	Atmospl	here	Water Colum	ì	Se	diment	Ashor	e	Degraded
	%	0.1	%	42.39	6	6.3%		•	0.2%	8.6%		7.6%
SIMAP	bbl	6	i	4,650	)	695			22	948		834
Modeling Results			Spatial	Extent of	Expos	ure over Th	resh	old (U	p to 30	Days After Sp	oill)	
	Water	· (Volum	e) – Ecc	logical	Surf	face (Area x	Day	s Exp	osed)	Shore	eline	(Length)
	Whol (1 n	le Oil 1g/l)		ssolved 01 mg/l)		cological l0 g/m²)		cioeco (0.01 g	nomic g/m²)	Ecologica (100 g/m²		Socioeconomic (1 g/m²)
	72,442	mil gal	175,95	1 mil gal	4 r	ni <sup>2</sup> -days	۷	l mi²-d	lays	40 mi		93 mi
						Shore Type	(Mi	les ove	r Ecolo	gical Thresho	ld)	
	Bee	drock	τ	Inconsolid Rock	ated	Sand	Beac	h	Mud	or Timber	A	rtificial Shore
	7.	2 mi		28.9 mi		0 1	mi			2.6 mi		0 mi
Ecological		Brac	kish/Est	tuarine We	etland					Ecological Th		
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower I	ntert ix	idal		ragmites Vetland		rub/Scrub and rested Wetland
Exposures	0.	3 mi		0.2 mi		0 1	mi			0.5 mi		0 mi
		F				itats Expos	ed (N	Ailes o		logical Thresl		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower I		idal		ragmites Vetland		rub/Scrub and rested Wetland
	(	) mi		0.5 mi		0 1	mi			0 mi		0 mi
										onse Operatio		
Socioeconomic Impacts	precautic could ca derailed for socio includin (about 4 would be to Cortla affected Point Mi	onary cle- use effect and/or buseconomi g residue 0 miles). e most af- undt. Add include: ile 42; W	arance z ts on con urned tra c effects and odo Riversio fected of itional in Danskar est Have	ones might mmunities and cars are and cars are and cars are and cars are and cars are and cars are and cars are and cars are and cars are and cars are and cars are and cars are and cars are and cars are and cars are an are and cars are an a	cause and bust removed the marin perationarinas, shore fit y be ex 66; Ch e 38. A	further impasinesses. Freed. 93 miles has, beaches, in deaches, indrom Newbur perienced in elsea Mile 6	of she of the office of the of	o vesse rail tra norelings, and ould b y, come Haven r town oseton tionary	el traffic ffic may e would real esta e focuse mercial rstraw, a s along Mile 65	be oiled above ate would be at ad on areas more property, and s and on the east	f pop or a fe the effecte re hea shore shore or inta	ulated areas ew days until the level of concern ed by oil, avily oiled front real estate e from Beacon akes that may be e 43; Indian

#### Newburgh CBR 11,000-bbl Bakken Crude Spill (Spring-High Tide) Response

			Res	sponse Equipment	and Plan Activation	n		
	NCP and		Tier	Response Require	ments	G		Ss Activated ays)
	USCG Type	Tie	er 1	Tier 2	Tier 3	Rail	Miles	River Miles
	Major Not defined	No requi	irement	No requirement	No requirement	QR-58	l miles 8 to QR- 56	22 river miles Mile 62-40 2016-68 to 2016-85
		Re	esponse (	Overview: Expecte	d Outcomes and C	hallenge	es	
	Protective Boo	oming	Mecha	nical Recovery	Shoreline Clear	nup	Othe	r Challenges
Spill Response <sup>16</sup>	Average river cur 1 kt will reduce beffectiveness, containment and diversionary bood configurations to angled to prevent entrainment and sover; exclusion a deflection configuration to be used to prot sensitive areas.	m be splash nd urations	rapid spreduce a be recovered mechanistic floating skimmer shoreling boom ar	cally; mobilize self-propelled rs; set up e containment eas with -trucks and	About 23% is antice to cause shoreline contamination. Per SCAT; wetland flus some substrate rendue to penetration sandy beaches; oile dock structures; oile debris removal.	form shing; noval on	Bakken significal high ben area arou wetland challeng wetlands response effects; pentrainm water co water into concerns areas neaprior to co water co	nt danger, as are izene vapors in and the spill; access may be e; disturbance of

At this time, there is no federal regulatory requirement for any specific contracted tiered response resource requirement. This does not mean that no response will take place.

## Newburgh CBR 11,000-bbl Bakken Crude Spill (Spring-Low Tide) Effects

	Loca	tion	Sc	ource	v	olume		Oil Ty	me	Season		Tide Stage
Scenario Description	Newb								_			
Description	Water		CBR	train spill	11	,000 bbl	Ва	ıkken (	crude	Spring		Low
Spill		Annu	al Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Probability	Spi	ill of Typ	e (Any	Volume)	S	pill of Type	and	Volun	ne	US		Hudson
_		0.000	00046			0.000	0003	5		0.2		0
	Lat/	Lon	Relea	ase Rate		telease te/Time		Iodel I Durati		Winds		Water Temperature
Conditions	41.51 -74.00 41.50 -74.00	0694 0517	Inst	antaneous	1 A	April 2016 1:00am			days	Light / variat (<5 kts)	ole	43°F
				Mass Ba	lance	at End of M	odel	Run (	After 3	0 Days)		
	Fate	Surf	ace	Atmospl	here	Water Column	l	Sec	diment	Ashore	e	Degraded
	%	0.0	1%	25.9%	б	7.5%		(	0.4%	4.2%		13.5%
SIMAP Modeling	bbl	3	}	2,853	3	827			39	462		1,489
Results			Spatial	Extent of	Expos	ure over Th	resh	old (U	p to 30	Days After Sp	ill)	
		r (Volum	•			ace (Area x						(Length)
		le Oil ng/l)		ssolved 01 mg/l)		cological 10 g/m²)		cioeco (0.01 g	nomic /m²)	Ecologica (100 g/m <sup>2</sup> )		Socioeconomic (1 g/m²)
	100,462	· ·		95 mil gal		ni <sup>2</sup> -days		3 mi <sup>2</sup> -d		34 mi	,	73 mi
		-	Shorel	ine Exposu	ire by	Shore Type	(Mil	les ove	r Ecolo	gical Thresho	ld)	
	Be	drock	J	Jnconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	artificial Shore
	5.	.7 mi		24.1 mi		0 1	ni			3.4 mi		0 mi
Faclasianl		Brac	kish/Est	tuarine We	tland	Habitats Ex	pose	d (Mil	les over	Ecological Th	resh	old)
Ecological Shoreline	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland
Exposures	0.	.1 mi		0.3 mi		0 1	ni			0.1 mi		0 mi
		F	reshwa	ter Wetlan	d Hab	itats Expos	ed (N	Iiles o	ver Eco	logical Thresl		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		nrub/Scrub and rested Wetland
	(	) mi		0.1 mi		0 1	ni			0 mi		0 mi
										onse Operatio		
Socioeconomic Impacts	precautionary clearance zones might cause further impacts to vessel traffic. Evacuation of populated areas could cause effects on communities and businesses. Freight rail traffic may be affected for a few days until the derailed and/or burned train cars are removed. 73 miles of shoreline would be oiled above the level of concern for socioeconomic effects; shorefront marinas, beaches, parks, and real estate would be affected by oil, including residue and odor. SCAT operations and cleanup would be focused on areas more heavily oiled (about 34 miles). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate would be most affected on the west shore from Newburgh to Haverstraw, and on the east shore from Beacon to Cortlandt. Additional impacts may be experienced in other towns along the river. Water intakes that may be										ew days until the level of concern ed by oil, avily oiled front real estate e from Beacon akes that may be	
	affected include: Danskammer Mile 66; Chelsea Mile 66; Roseton Mile 65; Charles Point Mile 43; Indian Point Mile 42; West Haverstraw Mile 38. Additional precautionary fishing advisories would likely be instituted for certain parts of the river in the vicinity of the spill.											
·												

#### Newburgh CBR 11,000-bbl Bakken Crude Spill (Spring-Low Tide) Response

			Res	sponse Equipment	and Plan Activati	ion		
	NCP and		Tier I	Response Require	ments	Gl		Ss Activated ays)
	USCG Type	Tie	er 1	Tier 2	Tier 3	Rail	Miles	River Miles
	Major Not defined	No requ	irement	No requirement	No requirement	QR-58	miles to QR-	22 river miles Mile 62-41 2016-68 to 2016-83
		R	esponse (	Overview: Expecte	ed Outcomes and	Challeng	es	
	Protective Boo	ming	Mecha	nical Recovery	Shoreline Cle	anup	Oth	er Challenges
Spill Response <sup>17</sup>	Average river cur 1 kt will reduce be effectiveness, containment and diversionary bood configurations to angled to prevent entrainment and over; exclusion a deflection config to be used to prot sensitive areas.	oom  be splash nd urations	rapid sp reduce a be recov mechani floating skimmer shorelin boom ar	ically; mobilize self-propelled rs; set up e containment reas with -trucks and	About 23% is ant to cause shoreling contamination. Pos SCAT; wetland f some substrate redue to penetration sandy beaches; of dock structures; of debris removal.	erform lushing; moval n on iled	Bakken signification in the signification is significated area area wetland challeng wetland response effects; entrainment water convernareas ne prior to water ne prior to	ability during a spill is access may be ge; disturbance of s during e may cause potential for ment of 24% in polumn leading to atake and fish kill is especially in the spill site dilution; perform polumn tracking, monitoring.

At this time, there is no federal regulatory requirement for any specific contracted tiered response resource requirement. This does not mean that no response will take place.

## Newburgh CBR 11,000-bbl Bakken Crude Spill (Summer-High Tide) Effects

	T	4	C.		7	·		O21 T		Canan		Tida Ctara
Scenario	Loca		50	ource	V	olume		Oil Ty	pe	Season		Tide Stage
Description	Newb Water		CBR t	rain spill	11	,000 bbl	Ва	ıkken o	crude	Summer		High
Spill		Annu	al Proba	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Probability	Spi	ll of Typ	e (Any \	Volume)	$S_1$	pill of Type	and	Volun	ne	US		Hudson
		0.000	00046			0.000	0003	5		0.2		0
	Lat/	Lon	Relea	se Rate		Release		Iodel Run		Winds		Water
	41.51	523			Da	te/Time		Durati	ion			Temperature
Conditions	-74.00 41.50 -74.00	0694 0517	Instar	ntaneous		7 August 2016 1:30pm 30 days			ys	NW / Ligh (<6 kts)	nt	81°F
				Mass Ba	alance	at End of M	Iodel	Run (	(After 3	0 Days)		
	Fate	Surf	ace	Atmosp	here	Water Column	1	Sec	diment	Ashor	e	Degraded
									0.0%	22.5%	)	2.8%
SIMAP Modeling	bbl	0	)	5,579	)	2,631			5	2,479	1	306
Results	Spatial Extent of Exposure over Threshold (Up to 30 Days Afte								Days After Sp	oill)		
	Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (Length)										(Length)	
		le Oil		ssolved		cological			nomic	Ecologica		Socioeconomic
	28,220	ng/l) mil gal		<b>01 mg/l)</b> 3 mil gal		l <b>0 g/m²)</b> ni²-days			1 g/m <sup>2</sup> ) (100 g/m <sup>2</sup> 2-days 45 mi			(1 g/m²) 54 mi
	20,220	inii gai		ne Exposure by Shore Type (Miles over Ecolo					ld)	3+ III		
		Unaangalidatad										4.6 1 (1
	Bedrock			Rock		Sand 1	веас	n	Mua	or Timber	A	rtificial Shore
	4.	4 mi		34.8 mi		0 1				2.9 mi		0 mi
Ecological		Brac								Ecological Th		
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland
Exposures	(	) mi		0 mi		0 1	mi			0 mi		0 mi
		F	reshwa	ter Wetlar	d Hab				ver Eco	logical Thresl	hold)	
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland
	0.	1 mi		3.3 mi		0 1	mi			0 mi		0 mi
										onse Operatio		
										or a few days;		
										Evacuation of be affected fo		ew days until the
	derailed	and/or bu	ırned tra	in cars are	remov	ed. 54 miles	of sh	orelin	e would	be oiled above	the	level of concern
Socioeconomic										te would be at		
Impacts		g residue and odor. SCAT operations and cleanup would be focused on areas more heavily oiled 5 miles). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate										
	would be most affected on the west shore from Newburgh to Haverstraw, and on the east shore									shore	e from Beacon	
										he river. Wate Charles Point		akes that may be
										advisories woi		
						vicinity of						,

#### Newburgh CBR 11,000-bbl Bakken Crude Spill (Summer-High Tide) Response

			Re	sponse Equipment	t and Plan Activat	ion			
	NCP and		Tier l	Response Require	ments	GI		Ss Activated ays)	
	USCG Type	Tie	r 1	Tier 2	Tier 3	Rail	Miles	River Miles	
	Major Not defined	No requi	irement	No requirement	No requirement	QR-58	miles to QR-	22 river miles Mile 62-41 2016-68 to 2016-83	
		Re	esponse (	Overview: Expecto	ed Outcomes and	Challenges			
	Protective Boo	oming	Mecha	anical Recovery	Shoreline Cle	anup	Oth	er Challenges	
Spill Response <sup>18</sup>	Average river cur 1 kt will reduce b effectiveness, containment and diversionary boor configurations to angled to prevent entrainment and s over; exclusion au deflection configuration be used to prot sensitive areas.	m be splash nd urations	rapid sp reduce a be recove mechan floating skimme shorelin boom an	ically; mobilize self-propelled rs; set up e containment reas with -trucks and	About 39% is ant to cause shoreline contamination. Po SCAT; wetland fi some substrate re due to penetration sandy beaches; oid dock structures; of debris removal.	erform lushing; moval n on led	Bakken signification in the signification is significated and wetland challeng wetland may cau potentiated of 12% leading and fish especial the spill dilution	ability during a spill is a spill; access may be a disturbance of s during response as effects; all for entrainment in water column to water intake kill concerns ly in areas near site prior to perform water tracking, and air	

 $<sup>^{18}</sup>$  At this time, there is no federal regulatory requirement for any specific contracted tiered response resource requirement. This does not mean that no response will take place.

## Newburgh CBR 11,000-bbl Bakken Crude Spill (Summer-Low Tide) Effects

Scenario	Loca	tion	So	ource	V	olume		Oil Ty	pe	Season		Tide Stage
Description	Newb Water		CBR t	rain spill	11	,000 bbl	Ва	ıkken o	crude	Summer		Low
Cn:II		Annu	al Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Spill Probability	Spi	ll of Typ	e (Any `	Volume)	$S_1$	pill of Type	and	Volun	ne	US		Hudson
		0.000	00046			0.000	0003	5		0.2		0
	Lat/	Lon	Relea	se Rate	Release Date/Time		Model Run Duration			Winds		Water Temperature
Conditions	41.5 -74.0 41.5 -74.0	)517	Instar	ntaneous		gust 2016 :30am	30 days		NW / light (<6 kts)		81°F	
				Mass Ba	alance	at End of M	Iodel	Run (	(After 30 Days)			_
	Fate	Surf	face	Atmosp	here	Water Column	1	Sec	diment	Ashor	e	Degraded
	%	0.0	)%	50.79	6	26.2%		(	0.1%	20.1%	)	3.0%
SIMAP Modeling	bbl	C	)	5,580	)	2,879			6	2,209		327
Results			Spatial	Extent of	Expos	ure over Th	resh	old (U	p to 30	Days After Sp	oill)	
	Water (Volume) – Ecological Surface (Area x Days Exposed) Whole Oil Dissolved Ecological Socioeconomic								L.			(Length)
	Who (1 n			ssolved 01 mg/l)		cological 10 g/m²)		cioeco (0.01 g		Ecologica (100 g/m <sup>2</sup>		Socioeconomic (1 g/m²)
	18,129			8 mil gal		mi <sup>2</sup> -days	11 mi <sup>2</sup> -days			45 mi		52 mi
			Shorel	ine Exposi	ire by	Shore Type	(Mi	les ove	r Ecolo	gical Thresho	ld)	
	Be	drock Unconsolida Rock			ated	Sand 1	Beac	h	Mud	or Timber	A	rtificial Shore
	2.	8 mi		36.1 mi					2.3 mi		0 mi	
Ecological		Brac							es over Ecological Tl			
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		Phragmites Wetland		rub/Scrub and rested Wetland
Laposures	(	) mi		0 mi		0 1	mi			0 mi		0 mi
		F								logical Thres		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland
	(	) mi		2.8 mi		0.6				0 mi		0.1 mi
	Potential Socioeconomic Impacts from Spill and Response Operations											
	Response operations may cause some impacts to vessel traffic along river for a few days; evacuations and precautionary clearance zones might cause further impacts to vessel traffic. Evacuation of populated areas could cause effects on communities and businesses. Freight rail traffic may be affected for a few days until derailed and/or burned train cars are removed. 52 miles of shoreline would be oiled above the level of concerning for socioeconomic effects; shorefront marinas, beaches, parks, and real estate would be affected by oil,										ulated areas ew days until the level of concern	
Socioeconomic Impacts	including residue and odor. SCAT operations and cleanup would be focused on areas more heavily oiled (about 45 miles). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate would be most affected on the west shore from Newburgh to Highlands, and on the east shore from Wappinger to Philipstown. Additional impacts may be experienced in other towns along the river. Water intakes that may be affected include: Danskammer Mile 66; Chelsea Mile 66; Roseton Mile 65. Additional precautionary fishing advisories would likely be instituted for certain parts of the river in the vicinity of the spill.									avily oiled front real estate from ver. Water 5. Additional		

#### Newburgh CBR 11,000-bbl Bakken Crude Spill (Summer-Low Tide) Response

			Re	sponse Equipment	t and Plan Activat	ion		
	NCP and		Tier l	Response Require	ments	GI		Ss Activated ays)
	USCG Type	Tie	r 1	Tier 2	Tier 3	Rail	Miles	River Miles
	Major Not defined	No requi	irement	No requirement	No requirement	QR-58	miles to QR-	9 river miles Mile 65-54 2016-66 to 2016-74
		Re	esponse (	Overview: Expect	ed Outcomes and	Challeng	es	
	Protective Boo	ming	Mecha	anical Recovery	Shoreline Cle	anup	Othe	er Challenges
Spill Response <sup>19</sup>	Average river cur 1 kt will reduce b effectiveness, containment and diversionary boor configurations to angled to prevent entrainment and s over; exclusion au deflection configuration be used to prot sensitive areas.	oom  n be splash nd urations	rapid sp reduce a be recove mechan floating skimme shorelin boom an	ically; mobilize self-propelled rs; set up the containment reas with -trucks and	About 20% is ant to cause shoreling contamination. Pos SCAT; wetland f some substrate redue to penetration sandy beaches; of dock structures; of debris removal.	erform lushing; moval n on iled	Bakken significa high ber area aro wetland challeng wetland may cau potentia of 26% leading and fish especial the spill dilution	ability during a spill is a spill; access may be ge; disturbance of s during response use effects; all for entrainment in water column to water intake kill concerns ly in areas near site prior to; perform water tracking, and air

<sup>&</sup>lt;sup>19</sup> At this time, there is no federal regulatory requirement for any specific contracted tiered response resource requirement. This does not mean that no response will take place.

## Newburgh CBR 11,000-bbl Bakken Crude Spill (Winter-High Tide) Effects

G	Loca	tion	So	ource	V	olume		Oil Ty	pe	Season	Í	Tide Stage
Scenario Description	Newb Water		CBR 1	rain spill	11	,000 bbl	Ва	akken o	crude	Winter		High
G W		Annu	al Prob	ability Any	where	in Hudson	Rive	er				nal Frequency 2015)
Spill Probability	Spi	ll of Typ	e (Any `	Volume)	S	pill of Type	and	Volun	ne e	US		Hudson
v		0.000	00046			0.000	0003	5		0.2		0
	Lat/	Lon	Relea	se Rate	Release Date/Time		Model Run Duration			Winds		Water Temperature
Conditions	41.51 -74.00 41.50 -74.00	0694 0517	Instar	ntaneous	ous 1 January 2016 3:00pm 30			30 days		SW / light (<8 kts)		32°F
				Mass Ba	alance	at End of M	Iodel	Run (	After 3	0 Days)		
	Fate	Surf	ace	Atmospl	here	Water Column		Sec	diment	Ashor	e	Degraded
	%	0.0	%	44.29	6	11.9%		(	0.2%	39.3%	)	4.4%
SIMAP Modeling	bbl	3		4,861	1	1,306			18	4,326		486
Results			Spatial	Extent of	Expos	ure over Th	resh	old (U	p to 30	Days After Sp	ill)	
	Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (Length)  Whole Oil Dissolved Ecological Socioeconomic Ecological Socioeconomic											
	Who (1 n		(0.0	ssolved 01 mg/l)	(1	cological 10 g/m²)		(0.01 g	$y/m^2$ )	Ecologica (100 g/m <sup>2</sup> )		Socioeconomic (1 g/m²)
	11,574	mil gal		3 mil gal	l .	ni <sup>2</sup> -days	2 mi <sup>2</sup> -days			60 mi		64 mi
			Shoreline Exposure by Shore Type (Miles over Ecological Threshold) Unconsolidated Unconsolidated Unconsolidated Unconsolidated						ld)			
	Be	drock	(	Rock	ated	Sand	Beac	h	Mud	or Timber	A	rtificial Shore
	9.	.3 mi		44.4 mi					5.4 mi		0 mi	
Ecological		Brac								Ecological Th		
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidai	Lower In	ntert [ix	ıaaı		ragmites Vetland		rub/Scrub and rested Wetland
Exposures	(	) mi		0.2 mi		0 1	mi			0 mi		0 mi
		F								logical Thresl		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland
	(	) mi		1 mi		0 1				0 mi		0 mi
	ъ									onse Operation		
Socioeconomic Impacts	precaution could can derailed for socion including (about 6 would be Poughke	onary cle use effect and/or buseconoming gresidue 0 miles). e most af eepsie to	arance z ts on con urned tra c effects and odo Riversic fected or	ones might mmunities a in cars are ; shorefron or. SCAT of le parks, m in the west s l. Addition	cause and bust remove the maring perational arinas, shore final al impa	further impa sinesses. Fre ed. 64 miles has, beaches, ns and clean beaches, inc com Marlbon acts may be	of sh of sh park up w dustry to to be	o vesse rail trail trail trail trail trail trail or eline s, and rould be y, coming the stony lenced	I traffic ffic may e would real esta e focuse mercial Point, and	be oiled above ate would be af ed on areas mor property, and s and on the east s r towns along t	f popur a fe e the last fecte re head shore the rive	ulated areas w days until the level of concern d by oil, avily oiled front real estate from ver. Water
		Poughkeepsie to Peekskill. Additional impacts may be experienced in other towns along the river. Water intakes that may be affected include: Danskammer Mile 66; Chelsea Mile 66; Roseton Mile 65. Additional precautionary fishing advisories would likely be instituted for certain parts of the river in the vicinity of the spill.										

#### Newburgh CBR 11,000-bbl Bakken Crude Spill (Winter-High Tide) Response

			Re	sponse Equipment	t and Plan Activat	ion		
	NCP and		Tier l	Response Require	ments	Gl	RPs/ GRS (7 d	s Activated ays)
	USCG Type	Tie	r 1	Tier 2	Tier 3	Rail	Miles	River Miles
	Major Not defined	No requi	irement	No requirement	No requirement	QR-58	miles to QR-	20 river miles Mile 68-48 2016-64 to 2016-78
		Re	esponse (	Overview: Expect	ed Outcomes and	Challeng		
	Protective Boo	oming	Mecha	anical Recovery	Shoreline Cle	anup	Othe	er Challenges
Spill Response <sup>20</sup>	Average river cur 1 kt will reduce b effectiveness, containment and diversionary boor configurations to angled to prevent entrainment and s over; exclusion an deflection configuration configuration configuration configuration and the second configuration and the second configuration configuratio	m be splash and urations ect litions mpact	rapid sp reduce a be recove mechan floating skimme shorelin boom at vacuum skimme Potentia may neg	ically; mobilize self-propelled rs; set up the containment reas with -trucks and	About 39% is and to cause shoreling contamination. Por SCAT; wetland for some substrate reduction to penetration sandy beaches; of dock structures; of debris removal.	erform lushing; moval n on iled	Bakken significa high ber area aro wetland challeng wetland may cau potentia of 12% leading and fish especial the spill dilution	bility during a spill is a ant danger, as are nzene vapors in und the spill; access may be ge; disturbance of s during response use effects; I for entrainment in water column to water intake kill concerns ly in areas near site prior to g perform water tracking, and air

 $<sup>^{20}</sup>$  At this time, there is no federal regulatory requirement for any specific contracted tiered response resource requirement. This does not mean that no response will take place.

## Newburgh CBR 11,000-bbl Bakken Crude Spill (Winter-Low Tide) Effects

g .	Loca	tion	So	ource	V	olume		Oil Ty	ре	Season		Tide Stage
Scenario Description	Newb Water		CBR t	rain spill	11	,000 bbl		akken o	_	Winter		Low
C211		u u	al Proba	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Spill Probability	Spi	ll of Typ	e (Any '	Volume)	S	pill of Type	and	Volun	ne	US		Hudson
v		0.000	0046			0.000	0003	5		0.2		0
	Lat/I	Lon	Relea	se Rate		telease te/Time		Iodel l Durati		Winds		Water Temperature
Conditions	41.51 -74.00 41.50 -74.00	0694 0517	Instar	ntaneous	1 Jai	nuary 2016 9:00am		30 day		SW / ligh (<8 kts)	t	32°F
				Mass Ba	alance	at End of M	lodel	Run (	(After 3	0 Days)		
	Fate	Surf	ace	Atmospl	here	Water Colum	1	Se	diment	Ashor	e	Degraded
	%	0.0	%	43.9%	б	12.2%		(	0.0%	39.0%	, )	4.9%
SIMAP Modeling	bbl	5		4,829	)	1,338			5	4,286	j	536
Results			Spatial	Extent of	Expos	ure over Th	resh	old (U	p to 30	Days After Sp	oill)	
	Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (											
	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$									Ecologica (100 g/m <sup>2</sup> )		Socioeconomic (1 g/m²)
	14,582	mil gal	60,41	2 mil gal	2 r	ni²-days	2	2 mi <sup>2</sup> -d	ays	58 mi		62 mi
			Shoreline Exposure by Shore Type (Miles over Ecol					r Ecolo	gical Thresho	ld)		
	Bee	Bedrock Unconsolida Rock			ated	Sand 1	Beac	h	Mud	or Timber	A	artificial Shore
	9.	3 mi		43.4 mi 0 r			<u> </u>			4 mi		0 mi
Ecological		Brac								Ecological Th		
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		nrub/Scrub and prested Wetland
Exposures	C	) mi		0.2 mi		0 1				0 mi		0 mi
		F	reshwa	ter Wetlar	d Hab	itats Expos	ed (N	Ailes o	ver Eco	logical Thresl	hold)	)
	0.	1 mi		1.6 mi		0 1	ni			0 mi		0 mi
	0.	1 mi		1.6 mi		0 1	ni			0 mi		0 mi
										onse Operatio		
Socioeconomic Impacts	precautic could ca derailed for socio including (about 5) would be Poughke intakes t	onary cleause effect and/or buseconoming residue 8 miles). The most affects to late that may be	arance z ts on courned tra c effects and odo Riversic fected or Peekskil pe affect	ones might mmunities a in cars are ; shorefron or. SCAT of le parks, m in the west s l. Addition ed include:	cause and bust removed to marin according to the control of the co	further impassinesses. Freed. 62 miles has, beaches, ins and clean beaches, incom Marlbon hets may be cammer Mile	of ship park up who to be expended t	o vesse rail tra- norelings, and ould be y, come Stony I cienced Chelse	I traffic.  If traffic may would real esta focuse mercial Point, ar in other a Mile 6	be oiled above te would be af d on areas moi	f pop or a fee the ffecte re hea shore the ri ile 65	ulated areas ew days until the level of concern ed by oil, avily oiled front real estate from ver. Water 5. Additional

#### Newburgh CBR 11,000-bbl Bakken Crude Spill (Winter-Low Tide) Response

			Re	sponse Equipment	t and Plan Activat	ion				
	NCP and		Tier l	Response Require	ments	GI	RPs/ GRS (7 d	s Activated ays)		
	USCG Type	Tie	er 1	Tier 2	Tier 3	Rail	Miles	River Miles		
	Major Not defined	No requ	irement	No requirement	No requirement	QR-58	miles to QR-	20 river miles Mile 68-48 2016-64 to 2016-78		
		R	esponse (	Overview: Expect	ed Outcomes and	d Outcomes and Challenges				
	Protective Boo	oming	Mecha	anical Recovery	Shoreline Cle	-	Othe	er Challenges		
Spill Response <sup>21</sup>	Average river cur 1 kt will reduce b effectiveness, containment and diversionary boor configurations to angled to prevent entrainment and s over; exclusion at deflection configuration	m be splash and urations ect litions mpact	rapid sp reduce a be recove mechan floating skimme shorelin boom an vacuum skimme Potentia may neg	ically; mobilize self-propelled rs; set up the containment reas with -trucks and	About 39% is and to cause shoreling contamination. Postart; wetland f some substrate redue to penetration sandy beaches; of dock structures; of debris removal.	erform lushing; moval n on iled	Bakken significa high bet area aro wetland challeng wetland may cau potentia of 12% leading and fish	her Challenges hability during a n spill is a cant danger, as are enzene vapors in round the spill; d access may be nge; disturbance of ds during response ause effects; ial for entrainment of in water column g to water intake sh kill concerns ally in areas near		
								; perform water tracking, and air ing.		

 $<sup>^{21}</sup>$  At this time, there is no federal regulatory requirement for any specific contracted tiered response resource requirement. This does not mean that no response will take place.

#### Newburgh CBR 11,000-bbl Bakken Crude Spill with Fire/Explosion

Scenario	Location	Sou	irce	Volume	Oil Type	Seas	on	Tide
Description	Newburgh Waterfront		R train pill	11,000 bbl	Bakken crude	W	/inter	High
Spill		An	nual Pr	obability		Historic	al Annua (2000-2	al Frequency 015)
Probability	Spill of Typ	e in Huds	son	Spill Volume	e in Hudson	US	5	Hudson
	0.000	0046		0.0000	00035	0.2	2	0
	Lat/Lon	Release Rate		Release Date/Time	Run Duration	Win	ds	Temperature
Conditions	41.51523 -74.00694 41.50517 -74.00572	Instanta	aneous	1 January 30 days 2016 3:00pm		SW /I (<8 I		32°F
Fire/Explosion	Pool Fire			Pool Fire	Vapor			Cloud Explosion
Probabilities Probabilities	Probability/In	cident		Probability 0.00000003	Explosion/			robability 0000000084
	Emergency	, Rosnone		Evacuati			alth/Safe	
Fire/Explosion Response 22	Specific incident be made early as attack fire or allow Port of Albany has firefighting vesse a 1,500 gpm wate Kingston, Albany FD have NYS superailers w/monitor oil derailment fire	to whether wit to but as small al, <i>Marine</i> or monitor and New oplied foats for rail	r to rn out.  I with burgh m	As an immediate measure, isolate for at least 50 me in all directions.  Large Spill  Consider initial evacuation for at meters (1000 fee  Fire  If tank, rail car involved in a fire 800 meters (1/2 directions; also, evacuation for 80 mile) in all directions.	downwind least 300 t).  or tank truck is e, ISOLATE for mile) in all consider initial 00 meters (1/2 tions.	may irritate of may produce and/or toxic dizziness or Light, sweet contain light as butane an gases have b flammable g released, wh with an ignit oils may also sulfide, a tox material, in to car. Due to to il, in an accibehavior of from that of	or burn sle irritating gases. Va suffocation crude oil are flammed propande een removement een they causes can they cause	apors may cause on.  Is will normally able gasses such a (unless these oved). These readily ignite if ome in contact are. These crude hydrogen tion hazard space of the tank atteristics of crude nario, the act may range for the lighter diesel fuel for the
				T		for responde	ng should	d be performed
	Flammable Distance	Total	al		pacts from Fire	for responde (Acres)	ng should er and pub	d be performed blic safety.
	Distance	<b>Tot:</b>		Residential	commercial	for responde (Acres) Indus	ing should er and pub trial	d be performed blic safety.  Public Use
Safety Impacts	Distance 581 feet	<b>Tot:</b> 0.2 ac		Residential 0 acres	Commercial 0.1 acre	for responde (Acres) Indus 0 ac	ing should er and pub trial	d be performed blic safety.
Safety Impacts	Distance		cre	Residential 0 acres	commercial	for responde (Acres)  Indus 0 acres	ing should or and pub trial res	d be performed blic safety.  Public Use

<sup>&</sup>lt;sup>22</sup> If concurrent with a spill to the water, see also spill response tables. If there is a fire and/or explosion, some or even most of the oil may be consumed by the fire, reducing the amount of oil that would spill into the river and affect shorelines. In most cases, it would be necessary to conduct at least some oil spill cleanup in addition to fire-fighting, though those operations would be secondary to emergency fire-fighting operations.

## Bear Mountain Bridge 2,500-bbl Home Heating Oil Spill

## Bear Mountain 2,500-bbl Home Heating Oil Spill (Spring-High Tide) Effects

G	Loca	tion		ource	7	olume		Oil Ty	pe	Season		Tide Stage	
Scenario Description	Bear Mo Brid		co	anker Illision vessel	2,	500 bbl	Н	ome he	ating	Spring		High	
Spill		Annı	ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)	
Probability	Spi	ll of Typ	e (Any `	Volume)	$\mathbf{S}_{1}$	pill of Type a	and `	Volum	e	US		Hudson	
		0.7	732		0.024					0.58		0	
Conditions	Lat/l		Relea	ase Rate	Da	Release ite/Time	Model Run Duration			Winds		Water Temperature	
Conditions	41.32198 -73.9831		Instant	aneous	1 April 2012 2:00am 30 days				ys	SW / light (<4 kts)		45°F	
				Mass Balance at End			Iode	l Run (	After 30	Days)			
	Fate	Surf	ace	Atmospl	nere	Water Column	l	Sec	diment	Ashore	e	Degraded	
	%	0.0				1.3%		(	).7%	15.7%		4.3%	
SIMAP Modeling	bbl	0 1,695 32 17							17	393		108	
Results					Expos	sure over Th	resh	old (U	p to 30 I	Days After Spi			
		r (Volum	e) – Eco	ological	Sur	face (Area x				Shore	eline	(Length)	
	Whol			ssolved		cological		ocioeco		Ecologica (100 g/m <sup>2</sup> )		Socioeconomic (1 g/m²)	
	( <b>1 n</b> 3,293 r			<b>01 mg/l)</b> ) mil gal	( <b>10 g/m²</b> ) 5 mi²-days		( <b>0.01 g/m<sup>2</sup></b> ) 12 mi <sup>2</sup> -days			15 mi	)	(1 g/m ) 55 mi	
	0,2501	8								ical Threshol	d)		
	Po	drock		Unconsolida		Sand 1				or Timber		Artificial Shore	
				Rock						F			
	3.4	43 mi	111/5		0.99 mi 0 mi rine Wetland Habitats Exposed (Miles over					.46 mi		0 mi	
Ecological		Bra										old) hrub/Scrub and	
Shoreline	Salt	marsh	'	pper Inter Mix	เเฉลเ	Lower II				Phragmites Wetland		orested Wetland	
Exposures	0.2	21 mi		0 mi		0 r	ni			0 mi		0 mi	
			Freshw	ater Wetla	nd Ha	bitats Expos	ed (I	Miles o	ver Ecol	ogical Thresh	old)		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites /etland		hrub/Scrub and orested Wetland	
	(	) mi		0 mi		0 n	mi			0 mi		0 mi	
	Potential Socioeconomic Impacts from Spill and Response Operations												
Socioeconomic Impacts	Response operations may cause some impacts to vessel traffic along river for a few days. 108 miles of shoreline would be oiled above the level of concern for socioeconomic effects; shorefront marinas, beaches, parks, and re estate would be affected by oil, including residue and odor. SCAT operations and cleanup would be focused on areas more heavily oiled (about 15 miles). Riverside parks, marinas, beaches, industry, commercial property, an shorefront real estate would be most affected on the west shore from Lloyd to Stony Point, and on the east shore from Hyde Park to Peekskill. Additional impacts may be experienced in other towns along the river. Water intakes that may be affected include: Hyde Park Mile 80; Poughkeepsie Mile 77; Highland Mile 76; IBM Mile 72; Danskammer Mile 66; Chelsea Mile 66; Roseton Mile 65; Charles Point Mile 43; Indian Point Mile 42. Additional precautionary fishing advisories would likely be instituted for much or all of the river.									is, parks, and real be focused on ial property, and on the east shore ver. Water 76; IBM Mile int Mile 42.			

## Bear Mountain 2,500-bbl Home Heating Oil Spill (Spring-High Tide) Response

			]	Response Equipmen	t and Plan Activa	tion			
	NCP and		Tier	Response Requirem	ents	GI		Ss Activated ays)	
	USCG Type	Tier 1 (24	4 hrs)	Tier 2	Tier 3	Rail N	Ailes	River Miles	
	Major MMPD	4,000 ft bo 1,000 ft + 3 skimming s 1,200 bbl/c 2,400 bbl s	300 per system lay	n/a	n/a	n/a		7 river miles Mile 44-77 2016-81 to 2016-80	
		]	Respons	se Overview: Expect	ed Outcomes and	Challenge	es		
G 'II D	Protective B	ooming	Mec	hanical Recovery	Shoreline Cl	eanup	Other Challenges		
Spill Response	High currents a 0.7 kts will red effectiveness, containment an diversionary be configurations angled to preve entrainment and over; exclusion deflection confit be used to presensitive areas.	veraging uce boom  d  com  to be  ent d splash and igurations rotect	68% e rapid s reduce recove mobili propel up sho boom	vaporation and spreading will e amount that can be cred mechanically; ize floating self-led skimmers; set oreline containment areas with vacuum-and skimmers.	About 16% is an to cause shorelin contamination. F SCAT; wetland some substrate r due to penetratic sandy beaches; c structures; oiled removal.	ricipated ne Perform flushing; emoval on on oiled dock	Wetland challen, wetland may can potential entraining column intake a concern areas no to diluti	ad access may be ge; disturbance of dis during response use effects; all for >1% ment in water may lead to water and fish kill as especially in ear spill site prior ion; perform water tracking, and air	

## Bear Mountain 2,500-bbl Home Heating Oil Spill (Spring-Low Tide) Effects

~ .	Loca	tion		ource	7	olume		Oil Ty	ype	Season		Tide Stage
Scenario Description	Bear Mo Brio		co	anker Illision vessel	2,	500 bbl	Н	ome he	_	Spring		Low
Spill		Annu	ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency ·2015)
Probability Probability	Spi	ll of Typ	e (Any \	Volume)	$S_1$	pill of Type	and	Volum	e	US		Hudson
		0.7	732			0.0	)24			0.58		0
Conditions	Lat/l		Relea	ase Rate	Da	Release te/Time		Model Durat		Winds		Water Temperature
Conditions	41.32 -73.98		Insta	ntaneous		pril 2012 0:00am		30 da	ys	SW / light (<4 kts)		45°F
				Mass B	alance	at End of M	Iode	Run (	(After 30	Days)		
	Fate	Surf	ace	Atmospl	nere	Water Column	l	Se	diment	Ashor	e	Degraded
	%	0.0	%	55.7%	ó	5.4%			2.4%	1.3%		10.8%
SIMAP Modeling	bbl	0.	6	1,394	1	136			59	32		271
Results		•			f Exposure over Threshold (Up to			p to 30 l	Days After Spi	ill)		
	Water	Water (Volume) - Ecological			Sur	Day	s Exp	osed)	Shore	eline	(Length)	
	Whol (1 n			ssolved 01 mg/l)	Ecological (10 g/m²)			Socioeconomic (0.01 g/m <sup>2</sup> )		Ecologica (100 g/m <sup>2</sup>		Socioeconomic (1 g/m²)
	13,532		28,92	8 mil gal	0.2	mi <sup>2</sup> -days	4	.7 mi <sup>2</sup> -	days	5 mi		34 mi
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)										
	Bee	drock	J	Jnconsolida Rock	ated	Sand l	Beac	h	Mud	or Timber	A	Artificial Shore
	1.5	51 mi		2.45 mi	5 mi 0 mi				0.1 mi		0 mi	
		Bra	ckish/Es	stuarine W	etland	cpose	ed (Mi	les over	Ecological Th	resh	old)	
Ecological Shoreline Exposures	Salt	marsh	U	pper Inter Mix					ragmites Vetland		hrub/Scrub and orested Wetland	
Laposures	0.	1 mi		0 mi		0 1	ni		(	).52 mi		0 mi
			Freshw	ater Wetla	nd Hal					ogical Thresh		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites Vetland		hrub/Scrub and orested Wetland
	(	) mi		0 mi		0 1				0 mi		0 mi
			Poten	tial Socioed	conomi	c Impacts fi	om	Spill a	nd Resp	onse Operatio	ns	
Socioeconomic Impacts	would be estate wo areas mo shorefron from Sto intakes th	e oiled abould be after heavily ne real estency Point hat may be	ove the last over the last ove	level of con y oil, includabout 5 mild ld be most a erstraw. Added include: (	cern for ling results. River fected ditional Charles	r socioecono sidue and odo verside parks I on the west I impacts ma s Point Mile	mic on. SO, man shor y be	effects CAT optinas, be from experientian F	shorefro perations peaches, i Peekski enced in Point Mil	ont marinas, be and cleanup w ndustry, comm Il to Ossining,	ache yould nercia and o ong t	

## Bear Mountain 2,500-bbl Home Heating Oil Spill (Spring-Low Tide) Response

			R	esponse Equipment	t and Plan Activati	on		
	NCP and		Tier I	Response Requirem	ents	G		Ss Activated ays)
	USCG Type	Tier 1 (2	4 hrs)	Tier 2	Tier 3	Rail	Miles	River Miles
	Major MMPD	4,000 ft bo 1,000 ft + 3 skimming s 1,200 bbl/c 2,400 bbl s	300 per system lay	n/a	n/a	n	/a	7 river miles Mile 44-37 2016-81 to 2016-87
		]	Response	Overview: Expecte	ed Outcomes and O	Challenge	s	
G TI D	Protective B	ooming	Mech	anical Recovery	Shoreline Clea	anup	Other Challenges	
Spill Response	High currents a 0.7 kt s will receffectiveness, containment and diversionary be configurations angled to preventrainment and over; exclusion deflection confit be used to presensitive areas.	veraging luce boom doom to be ent d splash and igurations rotect	56% ev. rapid sp reduce a recover mobiliz propelle up short boom at	aporation and breading will amount that can be ed mechanically; e floating selfed skimmers; set eline containment reas with vacuumnd skimmers.	About >1% is anti to cause shoreline contamination. Pe SCAT; wetland fir some substrate rer due to penetration sandy beaches; oil structures; oiled d removal.	rform ushing; noval on led dock	Wetland challeng wetlands may cau potentia entrainn column intake at concerns areas ne to dilutio	d access may be the; disturbance of so during response se effects; I for >5% then to in water may lead to water and fish kill se sepecially in ar spill site prior on; perform water tracking, and air

## Bear Mountain 2,500-bbl Home Heating Oil Spill (Summer-High Tide) Effects

a .	Loca	tion		ource	7	olume		Oil Ty	ype	Season		Tide Stage
Scenario Description	Bear Mo Brid		co	Canker ollision o vessel	2,	500 bbl	Н	ome he	-	Summer		High
Spill		Annu	ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Probability	Spi	ll of Typ	e (Any `	Volume)	$S_1$	pill of Type	and	Volum	e	US		Hudson
		0.7	732			0.0	)24			0.58		0
Conditions	Lat/l		Relea	ase Rate	Da	Release te/Time		Model Durat		Winds		Water Temperature
Conditions	41.32 -73.98		Insta	ntaneous		August 4:00pm		30 da	ys	SW / light (<4 kts)	:	81°F
				Mass B			Model Run (After 3		Days)		1	
	Fate	Surf	ace	Atmospl	here	Water Column	l	Se	diment	Ashor	e	Degraded
	%	0.00	2%	73.8%	ó	3.6%		(	0.1%	20.0%		2.6%
SIMAP Modeling	bbl	0.0	)4	1,846	6 89 2					499		64
Results		Spatial Extent of			Expos	sure over Th	resh	old (U	p to 30 l	Days After Spi	ill)	
		Water (Volume) - Ecological			Sur		s Exp				(Length)	
	Whol (1 m			ssolved	Ecological (10 g/m²)		Socioeconomic (0.01 g/m²)			Ecologica (100 g/m <sup>2</sup>		Socioeconomic (1 g/m <sup>2</sup> )
	26 mi							1 mi <sup>2</sup> -	_	17 mi	<i>)</i>	49 mi
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)										
	Bee	drock	Ţ	Unconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	Ā	Artificial Shore
	3.	6 mi		11 mi					1.8 mi		0 mi	
		Bra	ckish/E	stuarine W	etland Habitats Expos			posed (Miles over		Ecological Th	resh	old)
Ecological Shoreline Exposures	Salt	marsh	U	Jpper Inter Mix					ragmites Vetland		hrub/Scrub and orested Wetland	
Exposures	C	) mi		0.2 mi		0.2	mi			0 mi		0 mi
										ogical Thresh		
	Catta	il Marsh	U	Jpper Inter Mix	tidal	Lower II		idal		ragmites Vetland		hrub/Scrub and orested Wetland
	C	) mi		0 mi		0 1			<b>T</b>	0 mi	- \	0 mi
			Poten	tial Socioed	conomi	c Impacts fi	om (	Spill a	nd Resp	onse Operatio	ns	
Socioeconomic Impacts	would be estate wo areas mo shorefron from Sto intakes tl	e oiled ab ould be af ore heavily nt real est ney Point hat may b	ove the later to Have affected by oiled (ate would to Have affected	level of con y oil, includabout 17 mild be most a erstraw. Added include:	cern for ling results. Refected ditional Charles	r socioecono sidue and odd iverside park I on the west I impacts ma s Point Mile	omic on SC s, mash or shor y be 43; I	effects CAT op arinas, e from experiendian F	shorefro perations beaches, Peekskil enced in Point Mil	ont marinas, be and cleanup w industry, com- il to Ossining,	ache yould merc and c ong t	

# Bear Mountain 2,500-bbl Home Heating Oil Spill (Summer-High Tide) Response

			]	Response Equipmer	t and Plan Activa	tion			
	NCP and		Tier	Response Requirem	ents	GI		Ss Activated lays)	
	USCG Type	Tier 1 (24	4 hrs)	Tier 2	Tier 3	Rail N	Miles	River Miles	
	Major MMPD	4,000 ft bo 1,000 ft + 3 skimming s 1,200 bbl/c 2,400 bbl s	300 per system lay	n/a	n/a	n/	a	7 river miles Mile 44-37 2016-81 to 2016-87	
		]	Respons	se Overview: Expec	ted Outcomes and	Challenge	es		
a was	Protective B	ooming	Mec	hanical Recovery	Shoreline Cl	eanup	Other Challenges		
Spill Response	High currents a	veraging		vaporation and	About 20% is an	ticipated		nd access may be	
	0.7 kt s will red	luce boom		spreading will	to cause shoreling			ge; disturbance of	
	effectiveness,	,		amount that can be	contamination. I			ds during response	
	containment an		3,			flushing;		use effects;	
	diversionary bo			ze floating self- led skimmers; set	some substrate reduce to penetration			al for <4% ment in water	
	angled to preve			oreline containment	sandy beaches;			may lead to water	
	entrainment and				structures; oiled			and fish kill	
	over; exclusion		trucks	and skimmers.	removal.		concerr	ns especially in	
	deflection confi	igurations						ear spill site prior	
	to be used to pr							ion; perform water	
	sensitive areas.							tracking, and air	
							monito	ring.	

## Bear Mountain 2,500-bbl Home Heating Oil Spill (Summer-Low Tide) Effects

		-						•				
	Loca	tion		ource	7	olume		Oil Ty	ype	Season		Tide Stage
Scenario Description	Bear Mo Brio		co	anker ollision o vessel	2.	,500 bbl	Н	ome he	-	Summer		Low
Spill		Annu	ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency ·2015)
Probability	Spi	ill of Typ	e (Any \	Volume)	S	pill of Type	and	Volum	e	US		Hudson
		0.7	732			0.0	)24			0.58		0
Conditions	Lat/l	Lon	Relea	ase Rate	Da	Release ate/Time		Model Durat		Winds		Water Temperature
Conditions	41.32 -73.98		Insta	ntaneous		ngust 2012 3:00am		30 day	ys .	SW / ligh (<4 kts)	t	81°F
				Mass B	alance		Iodel Run (After 3			Days)		
	Fate	Surf	ace	Atmospl	here	Water Column	l	Se	diment	Ashor	e	Degraded
	%	0.000	)4%	70.1%	ó	7.2%		(	0.1%	18.9%	1	3.6%
SIMAP Modeling	bbl	0.0	)1	1,754	1	179			3	474		90
Results			Spatia	l Extent of	Expos	sure over Th	resh	old (U	p to 30 I	Days After Spi	ill)	
		r (Volum				face (Area x	-	_				(Length)
		ole Oil Dissolved mg/l) (0.001 mg/l)			Ecological (10 g/m²)			Socioeconomic (0.01 g/m²)		Ecologica (100 g/m²		Socioeconomic (1 g/m²)
	2,583 r	nil gal	14,48	8 mil gal	5 1	mi <sup>2</sup> -days	,	7 mi <sup>2</sup> -d	lays	16 mi		41 mi
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)										
	Bee	drock	Ţ	Jnconsolida Rock	ated	Sand l	Beac	h	Mud	or Timber	A	Artificial Shore
	4.	9 mi		10.9 mi		0 r	ni		(	0.5 mi		0 mi
Ecological		Bra								Ecological Th		
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites /etland		hrub/Scrub and orested Wetland
Exposures	0	) mi		0 mi		0 r	ni			0 mi		0 mi
										ogical Thresh		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites /etland		hrub/Scrub and orested Wetland
	(	) mi		0 mi		0 r				0 mi		0 mi
			Poten	tial Socioed	conomi	ic Impacts fr	om	Spill a	nd Resp	onse Operatio	ns	
Socioeconomic Impacts	would be estate wo areas mo shorefron	e oiled ab ould be af ore heavil nt real est	ove the later over the later over the later over the later would be seen to be seen the later over the later ov	level of con y oil, includ about 16 mi ld be most a	cern for ling results. Ruffected	or socioecono sidue and odo iverside park I on the west	mic or. SO as, ma shor	effects; CAT of arinas, e from	shorefro perations beaches, Peekskil	ont marinas, be and cleanup w industry, com I to Ossining,	ache ould merc and o	es of shoreline s, parks, and real l be focused on ial property, and on the east shore
	intakes tl	hat may b	e affecte	ed include:	Charles	s Point Mile	43; Iı	ndian P	oint Mil	other towns ald e 42; West Hav ch or all of the	versti	

# Bear Mountain 2,500-bbl Home Heating Oil Spill (Summer-Low Tide) Response

			F	Response Equipmen	t and Plan Activati	on		
	NCP and		Tier	Response Requiren	nents	G		Ss Activated ays)
	USCG Type	Tier 1 (24 hrs)		Tier 2	Tier 3	Rail	Miles	River Miles
	Major MMPD	4,000 ft bo 1,000 ft + 3 skimming s 1,200 bbl/d 2,400 bbl s	300 per system lay	n/a	n/a	n/a		7 river miles Mile 44-37 2016-81 to 2016-87
		J	Respons	e Overview: Expect	ed Outcomes and O	Challenge	s	
a mp	Protective B	ooming	Mec	hanical Recovery	Shoreline Clea	anup	p Other Challenges	
Spill Response	High currents a			vaporation and	About 19% is anti	•		d access may be
	0.7 kt s will red	luce boom		preading will	to cause shoreline			ge; disturbance of
	effectiveness, containment an	a		amount that can be	contamination. Perform SCAT; wetland flushing;			s during response
	diversionary bo			red mechanically; ze floating self-	some substrate rei			se effects; l for >7%
	configurations			led skimmers; set	due to penetration			nent in water
	angled to preve			reline containment	sandy beaches; oil		column	may lead to water
	entrainment and			areas with vacuum-	structures; oiled debris			nd fish kill
	over; exclusion		trucks	and skimmers.	removal.			s especially in
	deflection conf							ar spill site prior on; perform water
	sensitive areas.	to be used to protect						tracking, and air
	solisier vo urous.						monitor	

## Bear Mountain 2,500-bbl Home Heating Oil Spill (Winter-High Tide) Effects

	Loca	tion	So	ource	7	olume		Oil Type		Season		Tide Stage
Scenario Description	Bear Mo Brio		co	anker Illision vessel	2,	,500 bbl	Н	ome heating oil		Winter		High
Spill		Annı	ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Probability	Spi	ill of Typ	e (Any `	Volume)	$\mathbf{S}_{1}$	pill of Type	and	Volume		US		Hudson
-		0.7	732			0.0	)24			0.58		0
Conditions	Lat/l		Relea	ase Rate	Da	Release nte/Time		Model Run Duration		Winds		Water Temperature
Conditions	41.32 -73.98		Instan	taneous		nuary 2012 3:00am		30 days	S	outh / moder (4-18 kts)	ate	34°F
				Mass B	alance	at End of M	Iode	Run (After	· 30 I	Days)		
	Fate	Surf	ace	Atmospl	nere	Water Column	1	Sedime	nt	Ashore	e	Degraded
	%	0.00	5%	65.9%	ó	6.8%		0.5%		19.4%		6.9%
SIMAP Modeling	bbl	0.1	11	1,646	5 170 12					485		172
Results	<del>-</del>			l Extent of	f Exposure over Thro			old (Up to 3	0 Da	ys After Spi	ll)	
		Water (Volume) - Ecological			Sur	face (Area x						(Length)
	Whol (1 n			ssolved 01 mg/l)	Ecological (10 g/m²)		So	Socioeconomic (0.01 g/m²)		Ecologica (100 g/m <sup>2</sup>		Socioeconomic (1 g/m²)
	6,650 r	nil gal	5,986 mil gal			mi <sup>2</sup> -days	2	5 mi <sup>2</sup> -days		26 mi		48 mi
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)										
	Bee	drock	Ţ	Jnconsolida Rock	ated	Sand 1	Beac	h M	ud o	r Timber	A	artificial Shore
	5.	.5 mi		18.3 mi				1.	6 mi		0 mi	
Ecological		Bra			etland Habitats Exposed (Miles							
Shoreline Exposures	Salt	tmarsh	U	pper Inter Mix	tidal	Lower In		idal		gmites tland		nrub/Scrub and prested Wetland
Laposures	0.	.2 mi		0.2 mi		0 1	mi		0.	1 mi		0 mi
						bitats Expos						
	Catta	il Marsh	'	pper Inter Mix	tidal	Lower II		idal		gmites tland		nrub/Scrub and prested Wetland
	(	) mi		0 mi		0 1				mi		0 mi
			Poten	tial Socioed	conomi	ic Impacts fi	rom	Spill and R	spon	se Operatio	ns	
Socioeconomic Impacts	would be estate wo areas mo shorefron from Sto intakes th	e oiled ab ould be at ore heavil nt real est oney Poin hat may b	ove the land over the land ove	level of con y oil, includ about 26 mi ld be most a erstraw. Ado ed include: (	cern for ling results. Ruffected ditional Charles	or socioecono sidue and odo iverside park d on the west	omic or. So as, ma shor y be 42; I	effects; shor CAT operati arinas, beach re from Peek experienced ndian Point	efron ons an es, ir skill t in oth Mile	t marinas, be nd cleanup w ndustry, com- to Ossining, a her towns alo 42; West Hav	acherould mercand cong the ong the	

## Bear Mountain 2,500-bbl Home Heating Oil Spill (Winter-High Tide) Response

			F	Response Equipmen	t and Plan Activati	on			
	NCP and		Tier	Response Requiren	nents	G		Ss Activated ays)	
	USCG Type	Tier 1 (2	4 hrs)	Tier 2	Tier 3	Rail	Miles	River Miles	
	Major MMPD	4,000 ft bo 1,000 ft + 3 skimming s 1,200 bbl/c 2,400 bbl s	300 per system lay	n/a	n/a	n	/a	7 river miles Mile 44-37 2016-81 to 2016-87	
		]	Respons	e Overview: Expect	ed Outcomes and O	Challenge	es		
	Protective B	Booming	Mecl	hanical Recovery	Shoreline Cleanup		Other Challenges		
Spill Response	High currents a 0.7 kt s will receffectiveness, containment an diversionary be configurations	d doom	rapid s reduce recover mobiliz	vaporation and preading will amount that can be red mechanically; ze floating self-led skimmers; set	About 19% is anti to cause shoreline contamination. Pe SCAT; wetland flu some substrate red due to penetration	erform ushing; noval	challeng wetlands may cau potentia	d access may be ge; disturbance of s during response se effects; l for 7% ment in water	
	angled to preve	ent	up sho	reline containment	sandy beaches; oil	led dock		may lead to water	
	entrainment and over; exclusion deflection conf to be used to pr sensitive areas. ice conditions i boom deploym	and igurations totect Potential may affect	trucks Potenti may af	areas with vacuum- and skimmers. fal ice conditions fect mechanical ry operations.	structures; oiled d removal.	ebris	concerns areas ne to dilutio	nd fish kill s especially in ar spill site prior on; perform water tracking, and air ing.	

# Bear Mountain 2,500-bbl Home Heating Oil Spill (Winter-Low Tide) Effects

	Loca	tion	So	ource	7	olume		Oil Ty	vpe	Season		Tide Stage
Scenario Description	Bear Mo Brio	ountain	T	Canker Ollision		.500 bbl	Н	ome he	eating	Winter		Low
Spill		Annı			where	in Hudson	Rive	r				ual Frequency -2015)
Probability	Spi	ill of Typ	e (Any '	Volume)	S	pill of Type	and	Volum	e	US		Hudson
·		0.7	32			0.0	)24			0.58		0
Conditions	Lat/		Relea	ase Rate	Da	Release ite/Time		Model Durat		Winds		Water Temperature
Conditions	41.32 -73.98		Insta	ntaneous	2	nuary 2012 2:30am	30 days			South / moder (4-18 kts)	rate	34°F
				Mass B	alance		Model Run (After 3			Days)		
	Fate	Surf	ace	Atmospl	here	Water Column	1	Se	diment	Ashore	e	Degraded
	%	0.1	%	66.0% 7.4% 0.6%			17.6%		7.4%			
SIMAP Madalina	bbl							14	441		186	
Modeling Results	Spatial Extent of			Expos	sure over Th	resh	old (U	p to 30 l	Days After Spi	ill)		
	Water (Volume) – Ecological			Surface (Area x D			ys Exp	osed)	Shore	eline	(Length)	
	Who			ssolved 01 mg/l)	Ecological (10 g/m²)			Socioeconomic (0.01 g/m²)		Ecologica (100 g/m²		Socioeconomic (1 g/m²)
	7,787 r	nil gal	9,387	7 mil gal	mi <sup>2</sup> -days	3	3.6 mi <sup>2</sup> -	days	27 mi		56 mi	
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)										
	Be	drock	Į	Unconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	Artificial Shore
	5.	3 mi		18.8 mi	0 mi					2.4 mi		0 mi
Falsatad		Bra	ckish/E	stuarine W	etland	Habitats Ex	xposed (Miles over		les over	Ecological Th	resh	old)
Ecological Shoreline Exposures	Salt	marsh	U	Jpper Inter Mix	tidal	Lower In		idal		ragmites Vetland		hrub/Scrub and orested Wetland
Exposures	0.	3 mi		0.3 mi		0 1	mi			0.1 mi		0 mi
										logical Thresh		
	Cattail Marsh Upper Intertidal Lower Intertidal Mix Mix								ragmites Vetland		hrub/Scrub and orested Wetland	
	(	) mi		0 mi		0 1	mi			0 mi		0 mi
			Poten	tial Socioed	conomi	ic Impacts fi	rom	Spill a	nd Resp	onse Operatio	ns	
Socioeconomic Impacts	would be estate we areas mo shorefron from Sto intakes the	e oiled abould be at ore heavil ore real est oney Poin hat may b	ove the frected by oiled (ate would to Have affected	level of con y oil, includabout 27 mild be most a erstraw. Added include:	cern for ling restiles). Raffected ditional Charles	or socioecono sidue and odd iverside park d on the west l impacts ma s Point Mile	omic or. So as, ma shor y be 43; I	effects CAT op arinas, re from experie ndian F	shorefro perations beaches, Peekski enced in Point Mil	ont marinas, be and cleanup w industry, com Il to Ossining,	ache yould merc and o ong t	

# Bear Mountain 2,500-bbl Home Heating Oil Spill (Winter-Low Tide) Response

			R	Response Equipmen	t and Plan Activati	on		
	NCP and		Tier	Response Requiren	nents	G		Ss Activated ays)
	USCG Type	Tier 1 (2	4 hrs)	Tier 2	Tier 3	Rail	Miles	River Miles
	Major MMPD	4,000 ft bo 1,000 ft + 3 skimming s 1,200 bbl/o 2,400 bbl s	300 per system lay	n/a	n/a	n	/a	7 river miles Mile 44-37 2016-81 to 2016-87
		]	Response	e Overview: Expect	ed Outcomes and O	Challenge	es	
	Protective B	Booming	Mech	hanical Recovery	Shoreline Clea	anup	Oth	er Challenges
Spill Response	Response  High currents averaging 0.7 kt s will reduce bood effectiveness, containment and diversionary boom			vaporation and preading will amount that can be red mechanically; ze floating self-	About 18% is anti- to cause shoreline contamination. Pe SCAT; wetland fl- some substrate rei	erform ushing;	challeng wetlands may cau	d access may be ge; disturbance of s during response se effects; l for >7%
	configurations			led skimmers; set reline containment	due to penetration			nent in water
	angled to preve entrainment and		•	areas with vacuum-	sandy beaches; oil structures; oiled d			may lead to water nd fish kill
	over; exclusion and deflection configurations		Potential ice conditions area		areas ne	s especially in ar spill site prior		
	to be used to protect		-	fect mechanical ry operations.				on; perform water tracking, and air
	sensitive areas. Potential ice conditions may affect boom deployment.			ry operations.			monitor	•

#### Iona Island Crude-by-Rail 11,000-bbl Bakken Crude Spill

Iona Island CBR 11,000-bbl Bakken Crude Spill (Spring-High Tide) Effects

Scenario	Loca	tion	So	ource	V	olume		Oil Ty	pe	Season		Tide Stage
Description	Iona I	sland	CBR t	rain spill	11	,000 bbl	Ва	ıkken o	crude	Spring		High
Spill		Annu	al Proba	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Probability	Spi	ll of Typ	e (Any '	Volume)	Sı	pill of Type	and	Volun	ne	US		Hudson
		0.000	00046			0.000	0003	5		0.2		0
	Lat/		Relea	se Rate		telease te/Time		Iodel l Durati		Winds		Water Temperature
Conditions	41.31 -73.98 41.30 -73.98	8598 0628	Instan	taneous		april 2012 2:00am		30 da	ys	SW / light (<4 kts)		45°F
				Mass Ba	alance at End of Model			Run (	(After 3	) Days)		
	Fate	Surf	ace	Atmosp	here	Water Column	1	Sec	diment	Ashor	e	Degraded
	%	0.0	1%	50.69	5% 6.8% 5.4%			5.4%	8.2%		4.5%	
SIMAP Modeling	bbl	C	)	5,563	3	751			598	898		498
Modeling Results			Spatial	Extent of	Expos	ure over Th	resh	old (U	p to 30	Days After Sp	oill)	
	Water	· (Volum	e) – Eco	ological		ace (Area x	•					(Length)
	Whol (1 n			ssolved 01 mg/l)		cological 10 g/m²)		cioeco: (0.01 g	nomic y/m²)	Ecologica (100 g/m <sup>2</sup>		Socioeconomic (1 g/m²)
	49,340	mil gal	12,78	81 mil gal 11 mi <sup>2</sup> -days 17 mi <sup>2</sup> -days					days	32 mi		112 mi
					ine Exposure by Shore Type (Miles over Ecolo					gical Thresho	ld)	
	Bee	drock	Į	Inconsolid Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	artificial Shore
	5.	5 mi	21.5 mi 0.1 mi				3.1 mi		0 mi			
Ecological		Brac								Ecological Th		
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites /etland		nrub/Scrub and prested Wetland
2mposures	0.	4 mi		0.2 mi		0 1	mi			1.4 mi		0 mi
		I								logical Thresl		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites /etland		nrub/Scrub and prested Wetland
									0 mi			
	Potential Socioeconomic Impacts from Spill and Response Operations  Response operations may cause some impacts to vessel traffic along river for a few days; evacuations and											
Socioeconomic Impacts	precautic could ca derailed concern oil, inclu (about 3 would be Peekskil that may Addition	onary cle use effec and/or bu for socio ding resi 2 miles). e most af l to Yonk be affec	arance z ts on courred tra economic due and Riversic fected of cers. Add ted inclu itionary	ones might mmunities a in cars are ic effects; s odor. SCA de parks, m n the west s ditional impade: Charles	cause and bus remove horefro T oper arinas, shore fro pacts me s Point	further impassinesses. Freed. 112 mile ont marinas, ations and cobeaches, incom Stony Pay be experimented by the experimental of the experimental forms and the experimental forms and the experimental forms and the experimental forms are supposed for the experimental forms and the experimental forms are supposed for the experimental forms and the experimental forms are supposed for the experimental forms and the experimental forms are supposed for the experimental forms and the experimental forms are supposed for the experimental forms and the experimental forms are supposed for the experimental forms are supposed for the experimental forms and the experimental forms are supposed for the experimental forms and the experimental forms are supposed for the exp	ight ight ight is of so beach leanu lustry oint thence the lian I	o vesse rail trail trail trail trail trail thoreling hes, party would be alpited in of Point N	I traffic. ffic may ne would rks, and ld be foo mercial pine, New her town // lile 42;	Evacuation of be affected for d be oiled above real estate wo used on areas property, and s	f poper a fewer the	pulated areas ew days until the e level of oe affected by e heavily oiled front real estate east shore from Water intakes Mile 38.

#### Iona Island CBR 11,000-bbl Bakken Crude Spill (Spring-High Tide) Response

			Re	sponse Equipment	t and Plan Activat	ion		
	NCP and		Tier l	Response Require	ments	Gl		Ss Activated ays)
	USCG Type	Tieı	r 1	Tier 2	Tier 3	Rail	Miles	River Miles
	Major Not defined	No requi	rement	No requirement	No requirement	QR-	miles 40 to R42	26 river miles Mile 44-18 2016-81 to 2016-100
		Re	esponse (	Overview: Expecto	ed Outcomes and	Challeng	es	
	Protective Boo	oming	Mecha	nnical Recovery	Shoreline Clea		Othe	er Challenges
Spill Response <sup>23</sup>	Average river cur 1 kt will reduce b effectiveness, containment and diversionary bood configurations to angled to prevent entrainment and s over; exclusion at deflection config to be used to prot sensitive areas.	m be splash nd urations	rapid sp reduce a be recove mechan floating skimme shorelin boom an	ically; mobilize self-propelled rs; set up e containment reas with -trucks and	About 8% is antic Tappan Zee to car shoreline contami Perform SCAT; v flushing; some su removal due to penetration on san beaches; oiled do structures; oiled do removal.	use ination. vetland bstrate ndy ck	Bakken significa high ber area aro wetland challeng wetland may cau potentia of 7% in leading and fish especial the spill dilution	ability during a spill is access may be ge; disturbance of s during response use effects; all for entrainment to water column to water intake kill concerns ly in areas near site prior to; perform water tracking, and air ing

 $<sup>^{23}</sup>$  At this time, there is no federal regulatory requirement for any specific contracted tiered response resource requirement. This does not mean that no response will take place.

## Iona Island CBR 11,000-bbl Bakken Crude Spill (Spring-Low Tide) Effects

Scenario	Loca	tion	So	ource	V	olume	•	Oil Ty	ne	Season		Tide Stage
Description	Iona I			train spill		,000 bb1		ıkken o		Spring		Low
_						<u>′</u>					Ann	ual Frequency
Spill		Annu	al Proba	ability Any	where	in Hudson	Rive	r				2015)
Probability	Spi	ll of Typ	e (Any '	Volume)	$S_1$	pill of Type	and	Volun	ne	US		Hudson
		0.000	00046			0.000				0.2		0
	Lat/	Lon	Relea	se Rate		delease te/Time		Iodel l Durati		Winds		Water
G 1'4'	41.31	1363			Da	te/1 mie	J	Durau	1011			Temperature
Conditions	-73.93		Instan	ntaneous		pril 2012		30 day	/S	SW / light		45°F
	41.30 -73.98				9	9:00am				(<4 kts)		
	75.5	3100		Mass Ba	alance	at End of M	lodel	Run (	(After 3	0 Days)	l	
	Fate	Surf	ace	Atmosp	here	Water		Sec	diment	Ashor	e	Degraded
	%	0.0	1%	42.39		<b>Column</b> 6.1%	1	3	9.2%	1.3%		4.4%
SIMAP	bbl	0.0			42.3%     6.1%     39.2%       4,655     674     4,311					140		489
Modeling	001	0					resh			Days After Sp	sill)	407
Results	Water	· (Volum										(Length)
											Socioeconomic	
	(1 n			01 mg/l)		$(0 \text{ g/m}^2)$		(0.01 g		$(100 \text{ g/m}^2)$	)	$(1 \text{ g/m}^2)$
	8,691 r	nil gal		2 mil gal		ni <sup>2</sup> -days		3 mi <sup>2</sup> -d		6 mi	24 mi	
						Shore Type	(Mil	les ove	er Ecolo	gical Thresho	ld)	
	Be	drock	Ι'	Jnconsolid Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	artificial Shore
	1	mi		2.9 mi		0 1	ni			0.5 mi		0 mi
Ecological		Brac	kish/Est	tuarine We	etland				les over	Ecological Th		
Shoreline	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland
Exposures	0.	2 mi		0 mi		0 1				1.4 mi		0 mi
		F	reshwa	ter Wetlar	d Hab	itats Expos	ed (N	Ailes o	ver Eco	logical Thresl	hold)	)
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower I		idal		ragmites Vetland		nrub/Scrub and prested Wetland
	(	) mi		0 mi		0 1			•	0 mi	FU	0 mi
	Potential Socioeconomic Impacts from Spill and Response Operations											
	Respons	e operation						-		or a few days;		cuations and
										Evacuation of		
							_		•			ew days until the level of concern
Socioeconomic										ite would be af		
Impacts	includin	g residue	and odo	r. SCAT o <sub>j</sub>	peratio	ns and clean	up w	ould b	e focuse	d on areas moi	re he	avily oiled
-												ront real estate
										and on the eas towns along th		
	intakes t	hat may l	e affect	ed include:	Charle	es Point Mile	43;	Indian	Point N	lile 42; West H	Have	rstraw Mile 38.
	Addition	nal precau	itionary							ertain parts of		
	vicinity	of the spi	11.									

#### Iona Island CBR 11,000-bbl Bakken Crude Spill (Spring-Low Tide) Response

			Re	sponse Equipmen	t and Plan Activat	ion		
	NCP and		Tier l	Response Require	ments	Gl	RPs/ GRS (7 d	s Activated ays)
	USCG Type	Tie	r 1	Tier 2	Tier 3	Rail	Miles	River Miles
	Major Not defined	No requ	irement	No requirement	No requirement		miles to QR42	4 river miles Mile 44-40 2016-81 to 2016-84
		R	esponse (	Overview: Expect	ed Outcomes and	Challeng	es	
	Protective Boo	_			Shoreline Cle	anup	Othe	er Challenges
Spill Response <sup>24</sup>	Average river cur 1 kt will reduce b effectiveness, containment and diversionary bood configurations to angled to prevent entrainment and s over; exclusion ad deflection configuration be used to prot sensitive areas.	oom  be splash nd urations	rapid sp reduce a be recove mechan floating skimme shorelin boom an	ically; mobilize self-propelled rs; set up the containment reas with -trucks and	About 1% is anti- to cause shoreline contamination wl may result in limi shoreline cleanup operations. Perfo SCAT; wetland f some substrate re due to penetration sandy beaches; of dock structures; of debris removal.	enich nited o rm lushing; emoval n on	Bakken significa high ber area aro wetland challeng wetland may cau potentia of 6% ir leading and fish especial the spill dilution	bility during a spill is a ant danger, as are nzene vapors in und the spill; access may be ge; disturbance of s during response use effects; I for entrainment a water column to water intake kill concerns ly in areas near site prior to; perform water tracking, and air

 $<sup>^{24}</sup>$  At this time, there is no federal regulatory requirement for any specific contracted tiered response resource requirement. This does not mean that no response will take place.

## Iona Island CBR 11,000-bbl Bakken Crude Spill (Summer-High Tide) Effects

Scenario	Loca	tion	So	ource	V	olume		Oil Ty	pe	Season		Tide Stage
Description	Iona I	sland	CBR t	train spill	11	,000 bbl	Ва	akken c	crude	Summer		High
Spill		Annu	al Proba	ability Any	where	in Hudson	Rive	er				ual Frequency 2015)
Probability	Spi	ll of Typ	e (Any '	Volume)	$\mathbf{S}_{1}$	pill of Type	and	Volun	ne	US		Hudson
		0.000	00046			0.000	0003	5		0.2		0
	Lat/		Relea	ase Rate		Release te/Time		Iodel l Durati		Winds		Water Temperature
Conditions	41.31 -73.98 41.30 -73.98	8598 0628	Instanta	aneous		ıgust 2012 4:00pm		30 da <u>y</u>	ys	SW / light (<4 kts)		81°F
				Mass Ba	alance	at End of M	Iodel	Run (	After 30	Days)		
	Fate	Surf	ace	Atmosp	here	Water Column	1	Sec	diment	Ashor	e	Degraded
	%	0.0	1%	53.09	6	31.5%		(	0.3%	12.1%	)	3.0%
SIMAP Modeling	bbl	0	)	5,832 3,467 36					36	1,334		331
Modeling Results			Spatial	Extent of	Expos	ure over Th	resh	old (U	p to 30 l	Days After Sp	oill)	
	Water	· (Volum	e) – Eco	ological		face (Area x						(Length)
	(1 mg/l) (0.001 mg/l) (10 g/m <sup>2</sup> ) (0.01 g/m <sup>2</sup> ) (100 g/m <sup>2</sup> ) (1 g/m <sup>2</sup> )										Socioeconomic (1 g/m²)	
	50,800	mil gal	55,20	3 mil gal	19	mi <sup>2</sup> -days	19	9 mi²-c	lays	33 mi		40 mi
						Shore Type	(Mil	les ove	r Ecolog	gical Thresho	ld)	
	Be	drock	Ţ	Jnconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	artificial Shore
	6.	3 mi		20.1 mi		0 mi				5.9 mi		0 mi
Ecological		Brac								Ecological Th		
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		agmites etland		nrub/Scrub and prested Wetland
Emposures	0.	1 mi		0.2 mi		0.2	mi		(	).2 mi		0 mi
		I								ogical Thres		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		agmites etland		nrub/Scrub and prested Wetland
	0 mi 0 mi 0 mi 0 mi									0 mi		
										onse Operation		
Socioeconomic Impacts	precautic could ca derailed for socio includin (about 3 would be Philipsto intakes t Addition	onary cle use effec and/or be seconomi g residue 3 miles). e most af own to Cr hat may	arance z ts on con urned tra c effects and odo Riversic fected or coton Por oe affect	ones might mmunities a ain cars are s; shorefron or. SCAT of de parks, m n the west s int. Additioned include:	cause and but remove it marin perationarinas, shore find onal im	further impassinesses. Freed. 40 miles has, beaches, and clean beaches, incom Highlan pacts may be be Point Mile	of sh of sh park up we lustry ds to e expe	o vesse rail trainoreline is, and ould be worker the comments of the comments	I traffic. If traffic may we would real esta e focused mercial p straw, ar ed in othe Point M	nee oiled above te would be at all on areas mon property, and s and on the east er towns along	f poper a feether the frectors the shore shore the Haven	ew days until the level of concern ed by oil, avily oiled front real estate e from river. Water rstraw Mile 38.

#### Iona Island CBR 11,000-bbl Bakken Crude Spill (Summer-High Tide) Response

			Re	sponse Equipment	t and Plan Activat	ion		
	NCP and		Tier l	Response Require	ments	GI		s Activated ays)
	USCG Type	Tie	r 1	Tier 2	Tier 3	Rail	Miles	River Miles
	Major Not defined	No requi	irement	No requirement	No requirement		miles to QR42	15 river miles Mile 55-40 2016-73 to 2016-84
		Re	esponse (	Overview: Expecto	ed Outcomes and	Challenge	es	
	Protective Boo	oming	Mecha	nical Recovery	Shoreline Cle	anup	Othe	er Challenges
Spill Response <sup>25</sup>	Average river cur 1 kt will reduce b effectiveness, containment and diversionary boor configurations to angled to prevent entrainment and s over; exclusion at deflection configuration to be used to prot sensitive areas.	m be splash nd urations	rapid sp reduce a be recove mechan floating skimme shorelin boom an	ically; mobilize self-propelled rs; set up e containment reas with -trucks and	About 12% is ant to cause shoreling contamination. Post SCAT; wetland f some substrate redue to penetration sandy beaches; of dock structures; of debris removal.	erform lushing; moval n on lled	Bakken significa high ber area aro wetland challeng wetland may cau potentia of 32% leading and fish especial the spill dilution	bility during a spill is a ant danger, as are nzene vapors in und the spill; access may be ge; disturbance of s during response ase effects; I for entrainment in water column to water intake kill concerns ly in areas near site prior to ; perform water tracking, and air ing

 $<sup>^{25}</sup>$  At this time, there is no federal regulatory requirement for any specific contracted tiered response resource requirement. This does not mean that no response will take place.

## Iona Island CBR 11,000-bbl Bakken Crude Spill (Summer-Low Tide) Effects

Carrania	Loca	tion	Sc	ource	V	olume		Oil Ty	me	Season		Tide Stage
Scenario Description	Iona I			rain spill		,000 bbl		akken o		Summer		Low
	Tolla 1						l .		rude		Ann	ual Frequency
Spill		Annu	al Prob	ability Any	where	in Hudson	Rive	r				2015)
Probability	Spi	ll of Typ	e (Any `	Volume)	$S_{l}$	pill of Type	and	Volun	ne	US		Hudson
		0.000	00046			0.000	0003	5		0.2		0
	Lat/l	Lon	Relea	se Rate		elease		Iodel 1		Winds		Water
	41.31				Da	te/Time		Durati	ion	1,12222		Temperature
Conditions	-73.98		Instar	itaneous	1 Au	gust 2012		30 day	ys	SW / light		81°F
	41.30				8	:00am				(<4 kts)		
	-73.98	8100		Mass D	.1	-4 E J -6 N	f a al al	D (	(A 64 a.s. 21	) Da		
				Mass Ba	шапсе	at End of M Water	todei	Kun (	After 30	Days)		
	Fate	Surf	ace	Atmosp	here	Column	1	Sec	diment	Ashor	e	Degraded
	%	0.0	%	52.5%	6	32.9%		(	0.6%	10.6%	1	3.3%
SIMAP Modeling	bbl	0	)	5,778	3	3,623			64	1,167		368
Results			Spatial	Extent of	Expos	ure over Th	resh	old (U	p to 30 l	Days After Sp	ill)	
	Water	· (Volum	e) – Ecc	ological	Surf	ace (Area x	Day	s Exp	osed)	Shore	line	(Length)
	Whol			ssolved	Ecological Socioeconor					Ecologica		Socioeconomic
	(1 m			01 mg/l)		$(10 \text{ g/m}^2)$		( <b>0.01 g/m<sup>2</sup></b> ) 17 mi <sup>2</sup> -days		(100 g/m <sup>2</sup> ) 32 mi	)	(1 g/m²) 39 mi
	31,700	iiii gai		79,658 mil gal 17 mi <sup>2</sup> -days 17 mi <sup>2</sup> -day Shoreline Exposure by Shore Type (Miles over 1							147	39 1111
				Inconsolid					`			
	Bee	drock		Rock		Sand	Beac	h	Mud	or Timber	A	Artificial Shore
	6.	1 mi		19.4 mi		0 1	mi			5.9 mi		0 mi
Ecological		Brac				Habitats Exposed (Mil						
Shoreline	Salt	marsh	U	pper Inter Mix	tidal	Lower I		idal		ragmites /etland		nrub/Scrub and prested Wetland
Exposures	C	) mi		0.2 mi		0.2				).2 mi	re	0 mi
			reshwa		nd Hab			Ailes o		ogical Thresl	hold	
	G 11		T	pper Inter		Lower I				ragmites		nrub/Scrub and
	Catta	il Marsh		Mix		M	ix			etland	Fo	orested Wetland
	C	) mi		0 mi		0 1				0 mi		0 mi
										onse Operatio		
										or a few days; Evacuation of		
												ew days until the
	derailed	and/or bu	ırned tra	in cars are	remov	ed. 39 miles	of sh	orelin	e would	be oiled above	the	level of concern
Socioeconomic										te would be af		
Impacts		including residue and odor. SCAT operations and cleanup would be focused on areas more heavily oiled (about 32 miles). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate										
	(about 32 miles). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate would be most affected on the west shore from Highlands to Haverstraw, and on the east shore from northern											
	would be most affected on the west shore from Highlands to Haverstraw, and on the east shore from northern Cortlandt to Croton Point. Additional impacts may be experienced in other towns along the river. Water intakes that may be affected include: Charles Point Mile 43; Indian Point Mile 42; West Haverstraw Mile 38.											
		nal precau		nsning adv	isories	would likel	y be :	ınstitüt	eu ior ce	ertain parts of	ıne r	iver in the
		· · · · · · · · · · · · · · · · · · ·										

#### Iona Island CBR 11,000-bbl Bakken Crude Spill (Summer-Low Tide) Response

			Re	sponse Equipment	t and Plan Activat	ion		
	NCP and		Tier l	Response Require	ments	Gl	RPs/ GRS (7 d	s Activated ays)
	USCG Type	Tie	r 1	Tier 2	Tier 3	Rail	Miles	River Miles
	Major Not defined	No requ	irement	No requirement	No requirement		miles to QR42	12 river miles Mile 50-38 2016-76 to 2016-84
		R	esponse (	Overview: Expect	ed Outcomes and	Challeng	es	
	Protective Boo		Mecha	anical Recovery	Shoreline Cle	anup	Othe	er Challenges
Spill Response <sup>26</sup>	Average river cur 1 kt will reduce b effectiveness, containment and diversionary boor configurations to angled to prevent entrainment and s over; exclusion au deflection configuration be used to prot sensitive areas.	oom  n be splash nd urations	rapid sp reduce a be recove mechan floating skimme shorelin boom an	ically; mobilize self-propelled rs; set up the containment reas with -trucks and	About 11% is and to cause shoreling contamination. Postart; wetland f some substrate reduce to penetration sandy beaches; of dock structures; of debris removal.	erform lushing; moval n on iled	Bakken significa high ber area aro wetland challeng wetland may cau potentia of 33% leading and fish especial the spill dilution	bility during a spill is a ant danger, as are nzene vapors in und the spill; access may be ge; disturbance of s during response use effects; I for entrainment in water column to water intake kill concerns ly in areas near site prior to; perform water tracking, and air

 $<sup>^{26}</sup>$  At this time, there is no federal regulatory requirement for any specific contracted tiered response resource requirement. This does not mean that no response will take place.

## Iona Island CBR 11,000-bbl Bakken Crude Spill (Winter-High Tide) Effects

Scenario	Loca	tion	So	ource	V	olume	•	Oil Ty	pe	Season		Tide Stage
Description	Iona I	sland	CBR t	rain spill	11	,000 bbl		ıkken o		Winter		High
					w.hono	in Hudson				Historical	Ann	ual Frequency
Spill				1							2000-	2015)
Probability	Spi	ll of Typ		Volume)	S	pill of Type			1e	US		Hudson
		0.000	00046			0.000				0.2		0
	Lat/	Lon	Relea	se Rate		delease te/Time		Iodel l Durati		Winds		Water Temperature
Conditions	41.31				Du	te/ Time		Duraci	ion —			•
Conditions	-73.98 41.30		Instan	taneous		uary 2012 3:00am		30 da	ys	South / mode (4-18 kts)		34°F
	-73.98				C	o.ooaiii				(4-16 Kts)	'	
				Mass Ba	alance	at End of M	lodel	Run (	After 3	0 Days)		
	Fate	Surf	ace	Atmospl	here	Water Column		Sec	diment	Ashor	re	Degraded
	%	0.0	1%	50.4%	6	21.7%		3	3.6%	16.79	6	6.6%
SIMAP	bbl	1		5,541	1	2,389			394	1,835	5	724
Modeling Results			Spatial	Extent of	Expos	ure over Th	resh	old (U	p to 30	Days After S	pill)	
	Water	· (Volum	e) – Eco	logical	Surf	ace (Area x	Day	s Exp	osed)	Shor	eline	(Length)
	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$										Socioeconomic	
	34,964			4 mil gal		mi <sup>2</sup> -days		( <b>0.01 g</b> 1 mi <sup>2</sup> -c		(100 g/m 49 mi	)	( <b>1 g/m</b> ) 70 mi
	31,501	iiii gui				•				gical Thresh	old)	70 III
	Da	drock		Inconsolid		Sand				or Timber		Artificial Shore
				Rock				ш			А	
	8.	.3 mi		33.2 mi		0.2		1.0.51		5.2 mi	<u> </u>	0 mi
Ecological		Brac		pper Inter		Lower In				Ecological T		nold) nrub/Scrub and
Shoreline	Salt	marsh		pper Inter Mix	uuai	Lower II		iuai		Vetland		rested Wetland
Exposures	0.	2 mi		0.8 mi		0 1	ni			1.6 mi		0 mi
		F	reshwa	ter Wetlan	d Hab	itats Expos	ed (N	Ailes o	ver Eco	ological Thres	hold	)
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		nrub/Scrub and prested Wetland
	(	) mi		0 mi		0 1	ni			0 mi		0 mi
	Potential Socioeconomic Impacts from Spill and Response Operations											
										for a few days		
										. Evacuation of be affected for		ew days until the
												level of concern
Socioeconomic										ate would be a		
Impacts										ed on areas mo		
										property, and n the east shor		front real estate
										er towns alon		
	intakes t	hat may l	e affect	ed include:	Charle	es Point Mile	43;	Indian	Point N	Mile 42; West	Have	rstraw Mile 38.
		nal precau of the spi		fishing adv	isories	would likel	y be i	institut	ed for c	ertain parts of	the r	iver in the
	vicinity	or the spi	11.									

#### Iona Island CBR 11,000-bbl Bakken Crude Spill (Winter-High Tide) Response

			Re	sponse Equipment	t and Plan Activat	ion			
	NCP and		Tier l	Response Require	ments	GI	RPs/ GRS (7 d	Ss Activated ays)	
	USCG Type	Tie	r 1	Tier 2	Tier 3	Rail	Miles	River Miles	
	Major Not defined	No requ	irement	No requirement	No requirement		miles to QR42	12 river miles Mile 50-33 2016-76 to 2016-87	
		R	esponse (	Overview: Expect	ed Outcomes and	and Challenges			
	Protective Boo	_			Shoreline Cle	anup	Othe	er Challenges	
Spill Response <sup>27</sup>	Average river cur 1 kt will reduce b effectiveness, containment and diversionary boor configurations to angled to prevent entrainment and s over; exclusion at deflection configuration to be used to prot sensitive areas. Potential ice cond may negatively in boom deploymen	m be splash and urations ect litions mpact	rapid sp reduce a be recove mechan floating skimme shorelin boom an vacuum skimme Potentia may neg	ically; mobilize self-propelled rs; set up e containment reas with -trucks and	About 17% is ant to cause shoreline contamination. Po SCAT; wetland fi some substrate re due to penetration sandy beaches; oi dock structures; of debris removal.	erform lushing; moval n on led	Bakken significa high ber area aro wetland challeng wetland may cau potentia of 22% leading and fish especial the spill dilution	ability during a spill is access may be ge; disturbance of a during response ase effects; all for entrainment in water column to water intake kill concerns ly in areas near site prior to ; perform water tracking, and air	

At this time, there is no federal regulatory requirement for any specific contracted tiered response resource requirement. This does not mean that no response will take place.

## Iona Island CBR 11,000-bbl Bakken Crude Spill (Winter-Low Tide) Effects

G	Loca	tion	Sc	ource	7	olume	•	Oil Ty	ne.	Season		Tide Stage
Scenario Description	Iona I			train spill		,000 bbl		akken o		Winter		Low
	1011a 1			•		,			crude		Anni	ual Frequency
Cnill		Annu	al Prob	ability Any	where	in Hudson	Rive	r				2015)
Spill Probability	Spi	ll of Typ	e (Any	Volume)	S	pill of Type	and	Volun	ne	US		Hudson
•		0.000	00046			0.000	0003	5		0.2		0
	Lat/l	[ on	Rele	ase Rate		Release		Iodel 1		Winds		Water
	41.31		Keice	ase Rate	Da	te/Time		Durati	ion	Willias		Temperature
Conditions	-73.98		τ.		1 Jai	nuary 2012		20.1		South / moder	rate	2405
	41.30		Inst	antaneous		2:30am		30 day	/S	(4-18 kts)		34°F
	-73.93	8100		14 D		4 E 1 014		<b>D</b> /		0.D. \		
				Mass Ba	lance	at End of M Water	odel	Run (	After 3	0 Days)		
	Fate	Surf	face	Atmospl	nere	Column	l	Sec	diment	Ashor	e	Degraded
	%	0.0	1%	50.4%	ó	21.1%		3	3.6%	17.2%	)	6.4%
SIMAP Modeling	bbl	C	)	5,547	2,319 401				401	1,889	)	707
Results		Spatial Extent of Exposure over Threshold (Up to 30 Days After Spill)										
		r (Volum	e) – Eco	ological	Sur	face (Area x	-	_		Shore	eline	(Length)
											Socioeconomic	
	(1 mg/l)         (0.001 mg/l)         (10 g/m²)         (0.01 g/m²)         (100 g/m²)           35,267 mil gal         19,840 mil gal         10 mi²-days         12 mi²-days         50 mi									)	( <b>1 g/m²</b> ) 69 mi	
	33,207	iiii gai				•	e (Miles over Ecolo				14)	07 HII
	_			Jnconsolida								
	Be	drock		Rock		Sand 1	Beac.	h	Mud	or Timber	A	artificial Shore
	8.	5 mi		33.4 mi		0.2	mi			5 mi	0 mi	
Ecological		Brac								Ecological Th		
Shoreline	Salt	marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites Vetland		nrub/Scrub and prested Wetland
Exposures	0.	3 mi		0.6 mi		0 t	ni			1.6 mi		0 mi
		I	reshwa	ter Wetlan	d Hab	itats Expose	ed (N	Tiles o	ver Eco	logical Thres	hold)	)
	Catta	il Marsh	U	pper Inter	tidal	Lower In		idal		ragmites		nrub/Scrub and
				Mix		M			V	Vetland	Fo	rested Wetland
	0 mi 0 mi 0 mi 0 mi 0 mi  Potential Socioeconomic Impacts from Spill and Response Operations								UIII			
	Pagnong	a aparati								onse Operation or a few days;		viations and
										Evacuation of		
	could ca	use effec	ts on co	mmunities a	and bus	sinesses. Fre	ight 1	ail trat	ffic may	be affected fo	r a fe	ew days until the
										be oiled above ate would be af		level of concern
Socioeconomic Impacts										d on areas moi		
Impacts	(about 5	0 miles).	Riversic	de parks, ma	arinas,	beaches, ind	ustry	, com	nercial j	property, and s	hore	front real estate
										the east shore		
										er towns along Jile 42: West F		rıver. Water rstraw Mile 38.
	Addition	nal precau	ıtionary							ertain parts of		
	vicinity	of the spi	11.	-								

#### Iona Island CBR 11,000-bbl Bakken Crude Spill (Winter-Low Tide) Response

			R	Response Equipmen	t and Plan Activat	ion		
	NCP and		Tier	Response Requiren	nents	GI	RPs/ GRS (7 da	s Activated ays)
	USCG Type	Tier	1	Tier 2	Tier 3	Rail	Miles	River Miles
	Major Not defined	No require	ment	No requirement	No requirement		miles to QR42	12 river miles Mile 50-33 2016-76 to 2016-87
		R	esponse	e Overview: Expect	ted Outcomes and	Challenge	es	
	Protective F	Booming	Mec	hanical Recovery	Shoreline Cle	anup	Othe	er Challenges
Spill Response <sup>28</sup>	Spill Response 28			evaporation and spreading will e amount that can overed anically; mobilize an self-propelled aners; set up ine containment areas with m-trucks and aners. tial ice conditions segatively impact aning operations.	About 17% is an to cause shorelin contamination. P SCAT; wetland f some substrate redue to penetratio sandy beaches; o dock structures; debris removal.	erform lushing; moval n on iled	Bakken significa high ber area aro wetland challeng wetland response effects; entrainn water co water in concern areas ne prior to water co	bility during a spill is a ant danger, as are nzene vapors in und the spill; access may be ge; disturbance of s during e may cause potential for ment of 21% in blumn leading to take and fish kill is especially in ar the spill site dilution; perform blumn tracking, monitoring.

 $<sup>^{28}</sup>$  At this time, there is no federal regulatory requirement for any specific contracted tiered response resource requirement. This does not mean that no response will take place.

#### Iona Island CBR 11,000-bbl Bakken Crude Spill with Fire/Explosion

Scenario	Location	Sou	rce	Volume		Oil Type	Seas	on	Tide
Description	Iona Island	CBR tr	rain	11,000 bbl	Ba	akken crude	Summe	er	High
Cuill		An	nual P	robability			Historio	cal Annua (2000-20	al Frequency 015)
Spill Probability	Spill of Type	in Huds	on	Spill Volum	e ir	n Hudson	US	S	Hudson
	0.000	0046		0.000	000	)35	0.2	2	0
	Lat/Lon	Release	e Rate	Release Date/Time	R	un Duration	Win	ıds	Temperature
Conditions	41.31363 -73.98598 41.30628 -73.98100	Instanta	aneous	1 August 2012 4:00pm		30 days	SW / ] (<4 k		81°F
Fire/Explosion	Pool Fire			Pool Fire		Vapor			Cloud Explosion
Probabilities	Probability/In	cident		Probability 0.00000003		Explosion/			robability 0000000084
	Emergency	Doenone	<u> </u>	Evacuat			alth/Safet		
Fire/Explosion Response <sup>29</sup>	Specific incident to be made early a attack fire or allow Port of Albany ha firefighting vessel a 1,500 gpm wate Kingston, Albany FD have NYS superailers w/monitor oil derailment fire	as to when wit to but some small some small some small	I with the control of	As an immediate measure, isolate for at least 50 min all directions.  Large Spill  Consider initial evacuation for at meters (1000 fee fire)  If tank, rail car involved in a fire 800 meters (1/2 directions; also, evacuation for 80 mile) in all directions.	spii spii spieter l do l d	ll or leak area as (150 feet)  ownwind ast 300  tank truck is SOLATE for e) in all asider initial meters (1/2 as.	Fire may pro and/or toxic Vapors may suffocation. Light, sweet contain light as butane an gases have be flammable generated with an ignite oils may also a toxic inhall the vapor spender to the accident see product may gasoline for	cause diz crude oil ter flamm d propane deen remo gasses can ten they co tion source o contain lation haza ace of the ristics of co nario, the	sating, corrosive sziness or swill normally able gasses such e (unless these ved). These readily ignite if ome in contact e. These crude hydrogen sulfide, and material, in a tank car. Due to crude oil, in an behavior of this
	Flammable			npa	cts from Fire				
	Distance Total			Residential		Commercia			Public Use
Safety Impacts	581 feet	0.2 a	acre	0 acres		0 acres	es 0 acres 0.2 acre		
and ampueus	Downwind				ects		olosion (Acres)		
	Distance	To		Residential	Commercial				Public Use
	0.84 mile	68 a	cres	0 acres		0 acres			

<sup>&</sup>lt;sup>29</sup> If concurrent with a spill to the water, see also spill response tables. If there is a fire and/or explosion, some or even most of the oil may be consumed by the fire, reducing the amount of oil that would spill into the river and affect shorelines. In most cases, it would be necessary to conduct at least some oil spill cleanup in addition to fire-fighting, though those operations would be secondary to emergency fire-fighting operations.

#### Tappan Zee 2,500-bbl Home Heating Oil Spill

#### Tappan Zee 2,500-bbl Home Heating Oil Spill (Spring-High Tide) Effects

	Loca	tion	So	ource	7	olume		Oil Ty	pe	Season		Tide Stage	
Scenario Description	Tappa Brio		with	r Allision Bridge utment	2,	500 bbl	Hon	ne heat	ing oil	Spring		High	
Spill		Annu	ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)	
Probability	Spi	ill of Typ	e (Any `	Volume)	$\mathbf{S}_{\mathbf{I}}$	pill of Type	and '	Volum	e	US		Hudson	
		0.7	732			0.0	)24			0.58		0	
Conditions	Lat/	Lon	Relea	ase Rate	Da	Release te/Time		Model l Durati		Winds		Water Temperature	
Conditions	41.07 -73.8		Instan	taneous		pril 2012 0:00am		30 da	ys	North / mode (10-20 kts		50°F	
				Mass B	alance	at End of M	Iodel	Run (	After 30	Days)		_	
	Fate	Surf	ace	Atmospl	nere	Water Column	l	Sec	diment	Ashor	e	Degraded	
	%	0.0	%	65.9%	ó	2.6%		(	).6%	0.9%		4.8%	
SIMAP Modeling	bbl	1		1,649	)	66			14	24 121			
Results			Spatia	l Extent of	Expos	sure over Th	resh	old (U	p to 30 I	Days After Sp			
		r (Volum				face (Area x						(Length)	
	Who (1 n	le Oil ng/l)		ssolved 01 mg/l)		cological 10 g/m²)		cioeco (0.01 g	-	Ecologica (100 g/m <sup>2</sup>		Socioeconomic (1 g/m²)	
	9,640 r			9 mil gal		ni <sup>2</sup> -days		.5 mi <sup>2</sup> -		0 mi	,	46 mi	
			Shore	eline Expos	ure by	Shore Type	(Mi	les ove	r Ecolog	ical Threshol	d)		
	Be	drock	Ţ	Inconsolida Rock	ated	Sand l	Beac	h	Mud	or Timber	A	artificial Shore	
	(	) mi		0 mi		0 1	ni		(	).05 mi		0 mi	
Ecological		Bra								Ecological Th			
Shoreline	Salt	marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites Vetland		nrub/Scrub and prested Wetland	
Exposures	0.2	26 mi		0 mi		0 1	ni			0 mi		0 mi	
										ogical Thresh			
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites Vetland		nrub/Scrub and prested Wetland	
	(	) mi		0 mi		0 1			V	0 mi	FU	0 mi	
			Poten	tial Socioed	conomi	c Impacts fi	om S	Spill ar	nd Resp	onse Operatio	ns		
Socioeconomic Impacts	would be estate we areas mo shorefron Jersey, a towns ale	e oiled abould be afore heavily nt real est nd on the ong the ri	ove the late to the late would east show wer. No	level of con y oil, incluc <1 mile). R ld be most a ore from Do water intake	cern for ling resident iversident affected bbs Fe es wou	r socioecono sidue and odd e parks, mari l on the west rry to Manha	mic on. SC nas, shor ttan.	effects; CAT op beaches e from Additional	shorefroncerations s, industr Nyack to onal imp	ont marinas, be and cleanup v ry, commercia	eache yould l prop lewoo aperie	od Cliffs, New enced in other	

# Tappan Zee 2,500-bbl Home Heating Oil Spill (Spring-High Tide) Response

			F	Response Equipmen	nt and Plan Activati	on		_
	NCP and			Response Requirer				Ss Activated ays)
	USCG Type	Tier 1 (24	4 hrs)	Tier 2	Tier 3	Rail	Miles	River Miles
	Major MMPD	4,000 ft bood 1,000 ft + 3 skimming st 1,200 bbl/d 2,400 bbl s	300 per system lay	n/a	n/a	n	/a	16 river miles Mile 24-8 2016-97 to 2016-109
		J	Respons	e Overview: Expec	ted Outcomes and O	Challenge	es	
	Protective B	ooming	Mecl	hanical Recovery	Shoreline Clea	anup	Oth	er Challenges
Spill Response	Average river of 0.7 kt will redu effectiveness, containment and diversionary be configurations angled to preve entrainment and over; exclusion deflection confit to be used to presensitive areas.	d com to be ent d splash and igurations	rapid s reduce recove mobili: propell up sho boom a	vaporation and preading will amount that can be red mechanically; ze floating self-led skimmers; set reline containment areas with vacuum-and skimmers.	About <1% is antito cause shoreline contamination. Pe SCAT; wetland fl some substrate redue to penetration sandy beaches; oil structures; oiled d removal.	erform ushing; noval on led dock	heating significate wetland challeng wetlands may cau potentia of <3% may lead and fish especial the spill dilution:	bility during a oil spill is not ant danger, access may be ge; disturbance of s during response se effects; I for entrainment in water column I to water intake kill concerns ly in areas near site prior to perform water tracking, and air ing.

## Tappan Zee 2,500-bbl Home Heating Oil Spill (Spring-Low Tide) Effects

	Loca	tion	So	ource		olume	Ò	Oil Ty		Season		Tide Stage	
Scenario Description	Тарра	n Zee	with	r Allision Bridge utment	2,	500 bbl			ing oil	Spring		Low	
Spill		Annı			where	in Hudson	Rive	r				ual Frequency -2015)	
Probability	Spi	ill of Typ	e (Any	Volume)	Sı	pill of Type	and `	Volum	e	US		Hudson	
-		0.7	732			0.0	)24			0.58		0	
Conditions	Lat/		Relea	ase Rate	Da	Release ate/Time		Model : Durat		Winds		Water Temperature	
Conditions	41.07 -73.8		Instar	ntaneous	10	pril 2012 ):00am		30 da		North / mode (4-16 kts)		50°F	
				Mass B	alance	at End of M	Iode	l Run (	After 3	Days)			
	Fate	Surf	ace	Atmospl	nere	Water Column	1	Se	diment	Asho	re	Degraded	
	%	0.0	1%	68.9%	ó	1.4%		(	0.5%	1.2%	)	4.4%	
SIMAP Modeling	bbl	0	)	1,722	2	36			12	31		110	
Results			Spatia	al Extent of	f Exposure over Threshold (Up			p to 30	Days After S <sub>l</sub>	oill)			
	Water (Volume) – I			_			x Days Exposed)			Shor	reline	(Length)	
	Whole Oil Dissolved (1 mg/l) (0.001 mg/l			Ecological (10 g/m²)			Socioeconomic (0.01 g/m²)		Ecologic (100 g/m		Socioeconomic (1 g/m²)		
	9,495 r			7 mil gal		ni <sup>2</sup> -days		4.1 mi <sup>2</sup>		1 mi		55 mi	
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)											
	Be	drock	Ţ	Unconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	Artificial Shore	
	(	) mi		0.1 mi	0 mi					0.1 mi		0 mi	
		Bra	ckish/E	stuarine W	etland	Habitats Ex	kpose	ed (Mil	les over	Ecological Tl	resh	old)	
Ecological Shoreline Exposures	Salt	marsh	U	Jpper Inter Mix	tidal	Lower In		idal		ragmites Vetland		hrub/Scrub and orested Wetland	
Exposures	0.3	31 mi		0 mi		0 1	mi			0 mi		0 mi	
										logical Thres			
	Catta	il Marsh	U	Jpper Inter Mix	tidal	Lower In		idal		ragmites Vetland		hrub/Scrub and orested Wetland	
	(	) mi		0 mi		0 1	mi			0 mi		0 mi	
			Poten	tial Socioed	conomi	c Impacts fi	rom (	Spill a	nd Resp	onse Operati	ons		
Socioeconomic Impacts	would be estate we areas mo shorefron Jersey, a towns ale	e oiled abould be at ore heavil- nt real est nd on the ong the ri	ove the fected by oiled (tate would east shower. No	level of con y oil, includabout 1 mile ld be most a ore from Do water intake	cern fo ling res e). Rive affected bbs Fer es woul	r socioecono sidue and odd erside parks, I on the west rry to Manha	omic on SC or. SC mari shor ottan.	effects: CAT op nas, be re from Additi Iditiona	shorefre perations aches, in Nyack tonal impal precau	ont marinas, b and cleanup adustry, common o south of Eng	eache would nercia glewo xperi	es of shoreline es, parks, and real I be focused on I property, and od Cliffs, New enced in other sories would	

# Tappan Zee 2,500-bbl Home Heating Oil Spill (Spring-Low Tide) Response

			F	Response Equipmen	t and Plan Activati	on		
	NCP and		Tier	Response Requiren	nents	G		Ss Activated ays)
	USCG Type	Tier 1 (2	4 hrs)	Tier 2	Tier 3	Rail	Miles	River Miles
	Major MMPD	4,000 ft bo 1,000 ft + 3 skimming s 1,200 bbl/d 2,400 bbl s	300 per system lay	n/a	n/a	n	/a	12 river miles Mile 24-12 2016-97 to 2016-105
		]	Respons	e Overview: Expect	ed Outcomes and (	Challenge	es	
	Protective B	ooming	Mecl	hanical Recovery	Shoreline Clea	anup	Oth	er Challenges
Spill Response	Average river of 0.7 kt will redu effectiveness, containment and diversionary be configurations angled to preve entrainment and over; exclusion deflection confit to be used to presensitive areas.	d com to be ent d splash and igurations	rapid s reduce recover mobilize propell up show boom a	vaporation and preading will amount that can be red mechanically; ze floating self-led skimmers; set reline containment areas with vacuumand skimmers.	About >1% is antito cause shoreline contamination. Pe SCAT; wetland fl some substrate redue to penetration sandy beaches; oil structures; oiled d removal.	erform ushing; noval on led dock	heating significate wetland challeng wetland may cau potentia of <2% may lead and fish especial the spill dilution:	bility during a oil spill is not unt danger, access may be te; disturbance of s during response se effects; I for entrainment in water column d to water intake kill concerns ly in areas near site prior to the perform water tracking, and air ing.

# Tappan Zee 2,500-bbl Home Heating Oil Spill (Summer-High Tide) Effects

	Loca	tion	So	ource	V	olume		Oil Typ	e	Season		Tide Stage
Scenario Description	Tappa	n Zee	with	r Allision Bridge atment	2,	500 bbl		ne heatir		Summer		High
Spill		Annı	ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Probability	Spi	ill of Typ	e (Any \	Volume)	Sı	oill of Type	and '	Volume		US		Hudson
		0.7	732			0.0	)24			0.58		0
Conditions	Lat/l		Relea	se Rate		Release te/Time		Model R Duratio		Winds		Water Temperature
Conditions	41.07 -73.88		Instai	ntaneous		gust 2012 :00pm		30 days		SW / light (<4 kts)		81°F
				Mass B	alance	at End of M	Iodel	Run (A	fter 30	Days)		
	Fate	Surf	ace	Atmosph	nere	Water Column	l	Sedi	ment	Ashore	e	Degraded
	%	0.0	1%	79.0%	, )	12.6%		0.	2%	4.0%		4.2%
SIMAP Modeling	bbl	C	)	1,974		316			4	101		105
Results	Spatial Extent of Exposure over Threshold (Up to 30 I				to 30 D	ays After Spi	ll)					
	Water	r (Volum	e) – Eco	logical		face (Area x	-	_				(Length)
		Whole Oil Disso (1 mg/l) (0.001			(1	cological l0 g/m²)		cioecon (0.01 g/1	m <sup>2</sup> )	Ecologica (100 g/m <sup>2</sup>		Socioeconomic (1 g/m²)
	1,917 r	nil gal	23,16	5 mil gal	18	mi <sup>2</sup> -days	2	27 mi <sup>2</sup> -da	ays	3 mi		21 mi
			Shore	line Expos	ure by	Shore Type	(Mi	les over	Ecologi	ical Threshol	d)	
	Bee	drock	Į	Jnconsolida Rock	ited	Sand 1	Beac	h	Mud	or Timber	A	Artificial Shore
	0.	2 mi		2.6 mi		0 r	ni		C	.3 mi		0 mi
Ecological		Bra				Habitats Ex	cpose	ed (Miles	s over I	Cological Th	resh	old)
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower Ir M		idal		agmites etland		hrub/Scrub and prested Wetland
_	(	) mi		0 mi		0 r	ni			0 mi		0 mi
			Freshwa	ater Wetla	nd Hal	oitats Expos	ed (N	Ailes ove	er Ecolo	gical Thresh	old)	
	C	) mi		0 mi		0 r	ni			0 mi		0 mi
	C	) mi		0 mi		0 r	ni			0 mi		0 mi
										nse Operatio		
Socioeconomic Impacts	would be estate wo areas mo Jersey or along the	e oiled abould be at ore heavil or the wes e river. N	ove the last over the last ove	evel of con- y oil, includabout 3 mile about 3 mile nd Manhatta ntakes wou	cern for ling reses). Sho an on the	r socioecono idue and odo oreline impac ne east shore	mic or. SC ets we . Add itiona	effects; s CAT ope ould be l ditional i al precau	horefro rations limited t mpacts	nt marinas, be and cleanup w o a small part may be experi	ache ould of F ence	es of shoreline s, parks, and real be focused on ort Lee, New d in other towns would likely be

## Tappan Zee 2,500-bbl Home Heating Oil Spill (Summer-High Tide) Response

			I	Response Equipmen	t and Plan Activati	on		
	NCP and		Tier	Response Requirem	nents	G		Ss Activated ays)
	USCG Type	Tier 1 (2	4 hrs)	Tier 2	Tier 3	Rail	Miles	River Miles
	Major MMPD	4,000 ft bo 1,000 ft + 3 skimming s 1,200 bbl/d 2,400 bbl s	300 per system lay	n/a	n/a	n	/a	0 river miles <sup>30</sup> Mile 2 2016-97
		]	Respons	e Overview: Expect	ed Outcomes and C			
	Protective B	Booming	Mecl	hanical Recovery	Shoreline Clea	anup	Oth	er Challenges
Spill Response	Average river of 0.7 kt will redu effectiveness, containment and diversionary be configurations angled to preve entrainment and over; exclusion deflection confit to be used to presensitive areas.	d com to be ent d splash and igurations rotect	rapid s reduce recove mobili: propell up sho boom a	vaporation and preading will amount that can be red mechanically; ze floating self-led skimmers; set reline containment areas with vacuumand skimmers.	About 4% is antic to cause shoreline contamination. Pe SCAT; wetland fly some substrate rer due to penetration sandy beaches; oil structures; oiled deremoval.	rform ushing; noval on ed dock	heating significate wetland challeng wetlands may cau potentia of <13% may lead and fish especial the spill dilution:	bility during a oil spill is not unt danger, access may be te; disturbance of s during response se effects; I for entrainment oin water column d to water intake kill concerns ly in areas near site prior to perform water tracking, and air

## Tappan Zee 2,500-bbl Home Heating Oil Spill (Summer-Low Tide) Effects

	Loca	tion	So	ource	V	olume		Oil Ty	ype	Season		Tide Stage
Scenario Description	Tappa	n Zee	with	r Allision Bridge atment	2,	500 bbl	Hor	ne heat	ting oil	Summer		Low
Spill		Annı	ıal Prob	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)
Probability	Spi	ill of Typ	e (Any '	Volume)	$S_1$	pill of Type	and	Volum	e	US		Hudson
-		0.7	732			0.0	)24			0.58		0
Conditions	Lat/l		Relea	ase Rate	Da	Release ite/Time		Model Durat		Winds		Water Temperature
Conditions	41.07 -73.88		Insta	ntaneous	8	igust 2012 3:00am		30 da		SW / light (<4 kts)		81°F
				Mass B	alance	at End of M	<b>Iode</b>	l Run (	After 30	Days)		
	Fate	Surf	ace	Atmosph	here	Water Column	1	Se	diment	Ashor	e	Degraded
	%	0.0	%	75.9%	ó	13.2%		(	0.2%	6.1%		4.7%
SIMAP Modeling	bbl	O	)	1,896	5	330			4	153		116
Results		Spatial Extent of Exposure over Threshold (Up to 3			p to 30 1	Days After Spi	ill)					
	Water	r (Volum	(Volume) – Ecological Surface (Area x Days Exposed)			osed)	Shore	eline	(Length)			
		Whole Oil Dissolved Ecological Socioeconomic (1 mg/l) (0.001 mg/l) (10 g/m²) (0.01 g/m²)		Ecologica (100 g/m <sup>2</sup>		Socioeconomic (1 g/m²)						
	3,639 r			4 mil gal		mi <sup>2</sup> -days		18 mi <sup>2</sup> -		5 mi		16 mi
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)										
	Bee	drock	J	Jnconsolida Rock	ated	Sand l	Beac	h	Mud	or Timber	A	Artificial Shore
	0.	2 mi		5 mi	0 mi				0.3 mi	0 mi		
Essleries!		Bra	ckish/Es	stuarine W	etland	Habitats Ex	kpose	ed (Mil	les over	Ecological Th	resh	old)
Ecological Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites Vetland		hrub/Scrub and prested Wetland
Exposures	C	) mi		0.1 mi		0 1	mi			0 mi		0 mi
									ver Eco	logical Thresh		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites Vetland		hrub/Scrub and brested Wetland
	(	) mi		0 mi		0 1			V	0 mi	F	0 mi
			Poten		onomi			Spill a	nd Resn	onse Operatio	ns	
Socioeconomic Impacts							e along effects: CAT op- rinas, b re from pacts m	river for shorefre perations eaches, i Nyack t aay be ex	a few days. 16 ont marinas, be and cleanup windustry, commo o Englewood, laperienced in or	mile ache ould ercia New ther t	s, parks, and real be focused on al property, and Jersey, and on owns along the	

# Tappan Zee 2,500-bbl Home Heating Oil Spill (Summer-Low Tide) Response

			F	Response Equipment	t and Plan Activati	on		
	NCP and		Tier	Response Requirem	ents	G		Ss Activated ays)
	USCG Type	Tier 1 (2	4 hrs)	Tier 2	Tier 3	Rail	Miles	River Miles
	Major MMPD	4,000 ft bo 1,000 ft + 3 skimming s 1,200 bbl/d 2,400 bbl s	300 per system lay	n/a	n/a	n	/a	2 river miles Mile 24-26 2016-97 to 2016-96
	Response Overview: Expected Outcomes and Cl					Challenge		
	Protective B	ooming	Mecl	hanical Recovery	Shoreline Clea	anup	Oth	er Challenges
Spill Response	Average river of 0.7 kt will redu effectiveness, containment and diversionary be configurations angled to preve entrainment and over; exclusion deflection confit to be used to presensitive areas.	d oom to be ont d splash and igurations rotect	rapid s reduce recover mobilize propell up show boom a	vaporation and preading will amount that can be red mechanically; ze floating self-led skimmers; set reline containment areas with vacuumand skimmers.	About 6% is antic to cause shoreline contamination. Pe SCAT; wetland fl some substrate rer due to penetration sandy beaches; oil structures; oiled d removal.	rform ushing; noval on led dock	heating significate wetland challeng wetlands may cau potentia of >13% may lead and fish especial the spill dilution;	bility during a oil spill is not unt danger, access may be ge; disturbance of s during response see effects; I for entrainment o in water column d to water intake kill concerns ly in areas near site prior to g perform water tracking, and air

# Tappan Zee 2,500-bbl Home Heating Oil Spill (Winter-High Tide) Effects

	Loca	tion	Sc	ource	V	olume		Oil Ty	ype	Season		Tide Stage
Scenario Description	Tappa	n Zee	with	r Allision Bridge utment	2,	500 bbl	Hor	me heat	ting oil	Winter		High
Spill		Annu	ıal Prob	ability Any	where	in Hudson	Rive	er				ual Frequency 2015)
Probability	Spi	ill of Typ	e (Any '	Volume)	Sı	pill of Type	and `	Volum	e	US		Hudson
		0.7	32			0.0	)24			0.58		0
Conditions	Lat/l		Relea	ase Rate	Da	Release ate/Time		Model : Durat		Winds		Water Temperature
Conditions	41.07 -73.88		Insta	ntaneous	8	nuary 2012 3:00am		30 da		South / mode (4-18 kts)	rate	35°F
				Mass B	alance	at End of M	Iode	l Run (	(After 30	Days)		1
	Fate	Surf	ace	Atmosph	nere	Water Column	l	Se	diment	Ashore	e	Degraded
	%	0.0	%	66.2%	ó	5.3%			1.5%	5.4%		9.3%
SIMAP Modeling	bbl	1		1,655	5	133			37	135		232
Results			Spatia	al Extent of	Exposure over Threshold (U			old (U	p to 30 l	Days After Spi	ill)	
	Water	Vater (Volume) - Ecological			Surface (Area x D			ys Expo	osed)	Shore	eline	(Length)
		Whole Oil (1 mg/l)         Dissolved (0.001 mg/l)         Ecological (10 g/m²)         Socioeconom (0.01 g/m²)			Ecologica (100 g/m <sup>2</sup>		Socioeconomic (1 g/m²)					
	10,425			l mil gal		ni <sup>2</sup> -days		5 mi <sup>2</sup> -d		2 mi		60 mi
			Shoreline Exposure by Shore Type (Miles over Ecological Threshold)									
	Bee	drock	J	Unconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	Artificial Shore
	0.	1 mi		1.8 mi	0 mi					0.2 mi		0 mi
		Bra	ckish/E	stuarine W	etland	Habitats Ex	xpose	ed (Mil	les over	Ecological Th	resh	old)
Ecological Shoreline Exposures	Salt	marsh	U	Jpper Inter Mix	tidal	Lower In		idal		ragmites Vetland		hrub/Scrub and orested Wetland
Exposures	0.	4 mi		0 mi		0 1	mi			0 mi		0 mi
			Freshw	ater Wetla	nd Hal					logical Thresh		
									hrub/Scrub and orested Wetland			
	C	) mi		0 mi		0 1	mi			0 mi		0 mi
								-		onse Operatio		
Socioeconomic Impacts	would be estate wo areas mo shorefron east shor water int	e oiled ab ould be af ore heavil- nt real est re from H takes wou	ove the late over the late would astings the late would be after the late over the lat	level of con y oil, includabout 2 mile ld be most a o Yonkers.	cern fo ling res es). Riv affected Additional	r socioecono sidue and odo verside parks I on the west onal impacts	omic on SC, man shor may	effects: CAT of rinas, b e from be exp	shorefro perations peaches, i Nyack to perienced	and cleanup w ndustry, commo Alpine, New in other towns	ache ould ercia Jersa alor	s, parks, and real be focused on al property, and

# Tappan Zee 2,500-bbl Home Heating Oil Spill (Winter-High Tide) Response

			т	) E	4 a. J Dla. A attuat				
	NCP and			Response Equipmen Response Requiren				Ss Activated ays)	
	USCG Type	Tier 1 (2	4 hrs)	Tier 2	Tier 3	Rail	Miles	River Miles	
	Major MMPD	4,000 ft bo 1,000 ft + 3 skimming s 1,200 bbl/c 2,400 bbl s	300 per system lay	n/a	n/a	n	/a	3 river miles Mile 24-21 2016-97 to 2016-98	
		]	Respons	e Overview: Expect	ed Outcomes and O	Challenges			
	Protective B	Booming	Mec	hanical Recovery	Shoreline Clea	nup	Oth	er Challenges	
Spill Response	Average river of 0.7 kt will redu effectiveness, containment and diversionary be configurations angled to preve entrainment and over; exclusion deflection confit to be used to presensitive areas.  Potential ice comay negatively boom performation.	d com to be ent d splash and igurations rotect	rapid s reduce recove mobili propel up sho boom a trucks	vaporation and preading will amount that can be red mechanically; ze floating self-led skimmers; set reline containment areas with vacuumand skimmers.  ial ice conditions egatively impact er operations	About >5% is anti to cause shoreline contamination. Pe SCAT; wetland fli some substrate rer due to penetration sandy beaches; oil structures; oiled d removal.	rform ushing; noval on ed dock	heating significate wetland challeng wetlands may cau potentia of >5% may lead and fish especial the spill dilution;	bility during a bil spill is not ant danger, access may be ge; disturbance of s during response se effects; I for entrainment in water column d to water intake kill concerns ly in areas near site prior to s perform water tracking, and air ing.	

# Tappan Zee 2,500-bbl Home Heating Oil Spill (Winter-Low Tide) Effects

	Loca	tion	So	ource	7	olume		Oil Ty	vpe	Season		Tide Stage
Scenario Description	Тарра		Tanke with	r Allision Bridge utment		500 bbl	Hor	me heat	_	Winter		Low
Spill		Annı			where	in Hudson	Rive	er				ual Frequency 2015)
Probability <b>Probability</b>	Spi	ill of Typ	e (Any '	Volume)	S	pill of Type	and	Volum	e	US		Hudson
·		0.7	732			0.0	)24			0.58		0
Conditions	Lat/		Relea	ase Rate	Da	Release ite/Time		Model Durat		Winds		Water Temperature
Conditions	41.07 -73.8		Insta	ntaneous		nuary 2012 2:30am		30 da		South / mode (4-18 kts)		35°F
				Mass B	alance	at End of M	Iode	l Run (	After 30	) Days)		
	Fate	Surf	ace	Atmosph	iere	Water Column	1	Se	diment	Ashore	e	Degraded
	%	0.0	%	66.3%	ó	5.0%			1.4%	7.0%		9.1%
SIMAP Modeling	bbl	1		1,658	3	124			35	174		229
Results						sure over Threshold (Up to 30			p to 30 l	Days After Spi	ill)	
	Wate	Water (Volume) – Ecological			Surface (Area x Days Exposed)			osed)	Shore	eline	(Length)	
		$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$				Ecologica (100 g/m²		Socioeconomic (1 g/m²)				
	10,611	•		6 mil gal		mi <sup>2</sup> -days		5 mi <sup>2</sup> -c		3 mi	,	54 mi
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)										
	Be	drock	Ţ	Unconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	Artificial Shore
	0.	1 mi		2.3 mi	0 mi				0.2 mi		0 mi	
		Bra	ckish/E	stuarine W	etland	Habitats Ex	xpose	ed (Mil	les over	Ecological Th	resh	old)
Ecological Shoreline Exposures	Salt	marsh	U	Jpper Inter Mix	tidal	Lower II		idal		ragmites Vetland		hrub/Scrub and brested Wetland
Exposures	0.	4 mi		0 mi		0 1	mi			0 mi		0 mi
			Freshw	ater Wetla	nd Hal				ver Eco	logical Thresh		
									hrub/Scrub and prested Wetland			
	(	) mi		0 mi		0 1	mi			0 mi		0 mi
								-		onse Operatio		
Socioeconomic Impacts	would be estate we areas mo shorefrom on the ea along the	e oiled abould be at ore heavil- nt real est ast shore to e river. N	ove the last fected by oiled (ate would from Haston water in the last feat of the last feat from the last feat from the last feat feat from the last feat feat from the last feat feat feat from the last feat feat feat from the last feat feat feat feat feat feat feat fea	level of con- by oil, include about 3 mile ld be most a stings-on-Hi intakes wou	cern for ling results. River fected udson the lid be a	r socioecono sidue and odo verside parks I on the west to Riverdale.	omic or. SO , man shor Add ition	effects: CAT op- rinas, b re from litional al preca	shorefro perations eaches, i Oranget impacts	and cleanup windustry, commown to Englew may be experie	eache yould nercia yood, encec	es of shoreline s, parks, and real be focused on al property, and New Jersey, and d in other towns would likely be

# Tappan Zee 2,500-bbl Home Heating Oil Spill (Winter-Low Tide) Response

			R	Response Equipment	t and Plan Activatio	n		
	NCP and		Tier	Response Requiren	nents	G		Ss Activated ays)
	USCG Type	Tier 1 (24	hrs)	Tier 2	Tier 3	Rail	Miles	River Miles
	Major MMPD	4,000 ft boo 1,000 ft + 3 skimming s 1,200 bbl/ds 2,400 bbl st	00 per ystem ay	n/a	n/a	1	n/a	8 river miles Mile 23-15 2016-97 to 2016-103
		R	Response	e Overview: Expecte	ed Outcomes and C	hallenge		
	Protective B	ective Booming Mechanical Recovery Shorelin				nup	Othe	er Challenges
Spill Response	Average river of 0.7 kt will redu effectiveness, containment and diversionary be configurations angled to preve entrainment and over; exclusion deflection confit to be used to presensitive areas.  Potential ice co	d com to be ent d splash and igurations rotect	rapid syreduce recover mobilizy propell up short boom a trucks a	vaporation and preading will amount that can be red mechanically; ze floating self-ed skimmers; set reline containment areas with vacuum-and skimmers.  al ice conditions egatively impact er operations	About 7% is anticipate to cause shoreline contamination. Per SCAT; wetland flusome substrate rem due to penetration sandy beaches; oiled structures; oiled de removal.	form shing; noval on ed dock	heating of significal wetland challeng wetlands may caupotential of 5% in may lead and fish especiall the spill	bility during a bil spill is not nt danger, access may be e; disturbance of during response se effects; for entrainment water column I to water intake kill concerns y in areas near site prior to perform water
	may negatively boom performa	impact						racking, and air

#### Tappan Zee 50-bbl Heavy Fuel Oil Spill

#### Tappan Zee 50-bbl Heavy Fuel Oil Spill (Spring-High Tide) Effects

	Loca	tion	So	ource	V	olume		Oil Type		Season		Tide Stage
Scenario Description	Tappa	n Zee	with	r Allision Bridge atment		50 bbl	Не	avy Fuel Oil		Spring		High
Spill		Annu	al Proba	ability Any	where	in Hudson	Rive	er				ual Frequency 2015)
Probability	Spi	ll of Typ	e (Any \	Volume)	S	pill of Type	and	Volume		US		Hudson
·		0.7	732			0.0	)93			17.2		0
Conditions	Lat/		Relea	se Rate	Da	Release te/Time		Iodel Run Duration		Winds		Water Temperature
Conditions	41.07 -73.88		Instan	itaneous		pril 2012 :00am		30 days	No	orth / modera (10-20 kts)	ate	50°F
				Mass Ba	alance	at End of M	Iode	Run (After	30 I	Days)		
	Fate	Surf	ace	Atmosp	here	Water Column	1	Sedimen	t	Ashore	e	Degraded
	%	0.0	1%	8.7%	Ď	0.0%		0.0%		69.2%		22.1%
SIMAP Modeling	bbl	C	)	4		0		0		35		11
Results			Spatial	Extent of	Expos	ure over Th	resh	old (Up to 3	) Da	ys After Sp	ill)	
	Water (Volume) - Ecological Surface (Area x Days Exposed) Shoreline (Len											
	Whole Oil         Dissolved         Ecological         Socioeconomic         Ecological           (1 mg/l)         (0.001 mg/l)         (10 g/m²)         (0.01 g/m²)         (100 g/m²)										Socioeconomic (1 g/m²)	
	(1 mg/l) (0.001 mg/l) 2 mil gal <100 gal				$\begin{array}{c c} \hline 0.41 \text{ mi}^2\text{-days} & 0.41 \text{ mi}^2\text{-days} \end{array}$				0 mi	,	38 mi	
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)										
	Re	drock		Inconsolid		Sand				Timber		rtificial Shore
				Rock				1410			r.	
	(	) mi	L'-1. /E4	0 mi	.411	0 i		1 (3/1)		mi		0 mi
Ecological				pper Inter		Lower In		ed (Miles ove		gmites		rub/Scrub and
Shoreline Exposures	Salt	marsh		Mix	tiuai	M		ittai 1		tland		rested Wetland
Exposures	0.3	31 mi		0 mi		0 1	mi		0	mi		0 mi
		I	reshwa	ter Wetlar	ıd Hab	itats Expos	ed (N	Ailes over E	colog	gical Thresh		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal P		gmites tland		rub/Scrub and rested Wetland
	0 mi 0 mi 0 mi 0 m								0 mi			
								Spill and Re				
Socioeconomic Impacts	of conce oil, inclu (about < would be Dobbs F Addition Addition	ern for soon iding resing the simulation of the	cioecono due and Riverside fected of Ianhattan ts may b ntionary	omic effects odor. SCA e parks, man the west son, though the e experience fishing adv	s; shore T oper arinas, l shore fi he oilin ced in o	efront marina ations and controls beaches, independent from Nyack to ag of shoreling other towns	as, be leanu ustry o For nes w along	eaches, parks, p would be f , commercial tt Lee, New J rould likely b	and ocus properse e lin o wa	real estate ved on areas perty, and show, and on the nited to patcher intakes we	woul moref oref e eas hy ar vould	reas and tarballs.  I be affected.

#### Tappan Zee 50-bbl Heavy Fuel Oil Spill (Spring-High Tide) Response

			R	Response Equipme	nt and Plan Activ	vation			
	NCP and		Tier l	Response Requirer	nents	GR		Ss Activated ays)	
	USCG Type	Tier	1	Tier 2	Tier 3	Rail M	liles	River Miles	
	Not major AMPD <sup>31</sup>	n/a	ı	n/a	n/a	n/a		19 river miles Mile 24-5 2016-97 to 2016-110	
		R	espons	e Overview: Expec	ted Outcomes an	d Challeng	es		
	Protective Bo	ooming	Mec	hanical Recovery	Shoreline (	Cleanup	Other Challenges		
Spill Response	Average river control of the control	te boom  d om o be nt d splash and gurations	anticip evapo spread reduce be rec mecha floatin skimn shorel boom	9% evaporation is pated thus ration and rapid ling will minimally a amount that can overed anically; mobilize ne self-propelled ners; set up ine containment areas with	About 69% is to cause shorel contamination anticipation we a significant shorel cleanup operat Perform SCAT flushing; some removal due to penetration on beaches; oiled structures; oiled removal.	line so buld be for moreline ion. T; wetland substrate sandy dock	heating significations wetland challer wetland may can potention this in water however	nability during a g oil spill is not cant danger, d access may be nge; disturbance of ds during response nuse effects; ial for entrainment scenario is for 0% er column; er, still perform column tracking, monitoring.	

 $<sup>^{31}</sup>$  Required only when transferring cargo; underway allisions, no specific AMPD requirement, though a spill response would be undertaken.

<sup>145</sup> Hudson River Oil Spill Risk Assessment Volume 7: Spill Scenario Summaries

#### Tappan Zee 50-bbl Heavy Fuel Oil Spill (Spring-Low Tide) Effects

Consula	Loca	Tappan Zee Tanker Allision with Bridge Abutment So bbl Heavy Fuel Oil Spring Low									Tide Stage		
Scenario Description	Tappa	n Zee	with	Bridge	4	50 bbl	He	avy Fu	el Oil				
Spill		Annu	al Proba	ability Any	where	in Hudson	Rive	r				ual Frequency 2015)	
Probability	Spi	ll of Typ	e (Any '	Volume)	$S_{l}$	oill of Type	and	Volum	e	US		Hudson	
		0.7	32			0.0				17.2		0	
Conditions	Lat/l		Relea	se Rate	Da	elease te/Time		Iodel F Durati		Winds		Water Temperature	
	41.07 -73.88		Instan	taneous	10	oril 2012 0:00am		30 day		North / moder (4-16kts)	ate	50°F	
				Mass Ba	alance	at End of M	lodel	Run (	After 3	0 Days)			
	Fate	Surf	ace	Atmosp	here	Water Column	1	Sed	liment	Ashore	e	Degraded	
CDALD	% 0.0% 8.2% 0.0% 0.0%								.0%	69.6%		22.1%	
SIMAP Modeling	bbl   0   4   0   0     Spatial Extent of Exposure over Threshold (Up to 3									35 11			
Results									-				
		Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (Length)  Whole Oil Piccelved Feelerical Sociocomorphic Feelerical Sociocomorphic Feelerical Sociocomorphic Feelerical										_	
		$ \begin{array}{c c c c c c c c c c c c c c c c c c c $										Socioeconomic (1 g/m <sup>2</sup> )	
		3 mil gal <100 gal 0.43 mi <sup>2</sup> -days 0.43 mi <sup>2</sup> -days 1 mi 35 mi											
			Shorel	ine Exposi	ire by	Shore Type	(Mi	les ove	r Ecolo	gical Threshol	ld)		
	Bee	drock	U	Inconsolid Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	rtificial Shore	
	C	) mi		0.36 mi		0 1	ni			0.1 mi		0 mi	
Ecological		Brac								Ecological Th			
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites Vetland		rub/Scrub and rested Wetland	
Laposures	0.2	26 mi		0 mi		0 1	ni			0 mi		0 mi	
		F								ological Thresh			
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower II		idal		ragmites Vetland		rub/Scrub and rested Wetland	
	0 mi 0 mi 0 mi 0 mi										0 mi		
										onse Operatio		above the level	
Socioeconomic Impacts	of concern for socioeconomic effects; shorefront marinas, beaches, parks, and real estate would be affected by oil, including residue and odor. SCAT operations and cleanup would be focused on areas more heavily oiled (about 1 mile). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate would be most affected on the west shore from Orangetown to Alpine, New Jersey, and on the east shore from Hastings-on-Hudson to Yonkers, though the oiling of shorelines would likely be limited to patchy areas and tarballs. Additional impacts may be experienced in other towns along the river. No water intakes would be affected. Additional precautionary fishing advisories would likely be instituted for certain parts of the river in the immediate vicinity of the spill.												

#### Tappan Zee 50-bbl Heavy Fuel Oil Spill (Spring-Low Tide) Response

			R	esponse Equipmen	t and Plan Activa	tion			
	NCP and		Tier 1	Response Requirer	nents	GF		Ss Activated ays)	
	USCG Type	Tier	1	Tier 2	Tier 3	Rail N	Miles	River Miles	
	Not major AMPD <sup>32</sup>	n/a	ı	n/a	n/a	n/	a	19 river miles Mile 23-18 2016-97 to 2016-101	
		R	esponse	Overview: Expect	ted Outcomes and	Challeng	es		
	Protective Bo	ooming	Mecl	nanical Recovery	Shoreline Cl	eanup	Oth	Other Challenges	
Spill Response	Average river control of the control	te boom  d om o be nt d splash and gurations	anticip evapor spread reduce be reco mecha floatin skimm shoreli boom	nically; mobilize g self-propelled hers; set up ine containment hareas with m-trucks and	About 70% is an to cause shoreling contamination is anticipation would a significant should be cleanup operation. Perform SCAT; flushing; some is removal due to penetration on is beaches; oiled distructures; oiled removal.	ne o o uld be for oreline on. wetland substrate andy	heating signific wetland challen wetland may ca potenti- in this s in wate however	ability during a goil spill is not cant danger, d access may be ge; disturbance of ds during response use effects; al for entrainment scenario is for 0% r column; er, still perform olumn tracking, monitoring.	

 $<sup>^{32}</sup>$  Required only when transferring cargo; underway allisions, no specific AMPD requirement, though a spill response would be undertaken.

<sup>147</sup> Hudson River Oil Spill Risk Assessment Volume 7: Spill Scenario Summaries

#### Tappan Zee 50-bbl Heavy Fuel Oil Spill (Summer-High Tide) Effects

									<del></del>				
Coores	LocationSourceVolumeOil TypeSeasonTide StageTappan ZeeTanker Allision with Bridge Abutment50 bblHeavy Fuel OilSummerHigh										Tide Stage		
Scenario Description	Tappa	n Zee	with	Bridge	4	50 bbl	He	avy Fu	el Oil	Summer		High	
Spill		Annua	d Proba	ability Any	where	in Hudson	Rive	er				ual Frequency 2015)	
Probability	Spi	ll of Type	(Any V	Volume)	Sı	pill of Type	and	Volun	ne	US		Hudson	
		0.7	32			0.0	93			17.2		0	
Conditions	Lat/l		Relea	se Rate	Da	telease te/Time		Iodel l Durati		Winds		Water Temperature	
Conditions	41.071 -73.88		Instan	taneous		gust 2012 :00pm		30 day	/S	SW / light (<4 kts)		81°F	
				Mass Ba	alance	at End of M	lodel	Run (	After 30	Days)		_	
	Fate	Surf	ace	Atmosp	here	Water Column	ı	Sec	diment	Ashore	e	Degraded	
	% 0.0% 8.6% 0.0% 0.0%									69.4%		22.1%	
SIMAP Modeling	Spatial Extent of Exposure over Threshold (Up to 30									35 11			
Results			Spatial	Extent of							-		
		Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (Length)										. 0 .	
		$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$										Socioeconomic	
	<100			nil gal		mi <sup>2</sup> -days		65 mi <sup>2</sup> -		3 mi	,	13 mi	
			Shorel	ine Exposi	are by	Shore Type	(Mi	les ove	r Ecolog	gical Threshol	ld)		
	Bee	drock	U	nconsolid Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	artificial Shore	
	0.1	16 mi		2.97 mi		0 1	ni		0	.26 mi		0 mi	
Ecological		Bracl								Ecological Th	resh	nold)	
Shoreline	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland	
Exposures	C	) mi		0 mi		0 1	mi			0 mi		0 mi	
		F				itats Expos	ed (N	Ailes o		ogical Thresh			
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites /etland		nrub/Scrub and rested Wetland	
	0 mi 0 mi 0 mi 0 mi									0 mi			
										onse Operatio		above the level	
Socioeconomic Impacts	of concern for socioeconomic effects; shorefront marinas, beaches, parks, and real estate would be affected by oil, including residue and odor. SCAT operations and cleanup would be focused on areas more heavily oiled (about 3 miles). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate would be most affected on the west shore from Nyack to Alpine, New Jersey, and on the east shore from Tarrytown to Yonkers, though the oiling of shorelines would likely be limited to patchy areas and tarballs. Additional impacts may be experienced in other towns along the river. No water intakes would be affected. Additional precautionary fishing advisories would likely be instituted for certain parts of the river in the immediate vicinity of the spill.												

#### Tappan Zee 50-bbl Heavy Fuel Oil Spill (Summer-High Tide) Response

				Response Equip	pment	and Plan	Activation			
	NCP and	7	ier R	esponse Require	ement	s	GRPs/		Ss Activated ays)	
	USCG Type	Tier 1	1	Tier 2	ŗ	Гier 3	Rail Miles		River Miles	
	Not major AMPD <sup>33</sup>	n/a		n/a		n/a	n/a		5 river miles Mile 27-22 2016-98 to 2016-99	
		R	espon	se Overview: E	xpecto	ed Outcom	es and Challenge	es		
	Protective Bo	oming	Mechanical Recovery			Shorel	line Cleanup	(	Other Challenges	
C-:11 D	Average river co	arrents of	Only 9% evaporation is			About 69	% is anticipated	Flammability during a		
Spill Response	0.7 kt will reduc	ce boom	antic	cipated thus		to cause s	shoreline	heat	ting oil spill is not	
	effectiveness,		evaporation and rapid			contamin			ificant danger,	
	containment and		spreading will minimally				on would be for		land access may be	
	diversionary bo			ce amount that c	an	_	ant shoreline		llenge; disturbance of	
	configurations t			ecovered	70	cleanup o	peration. SCAT; wetland		lands during response	
	angled to prever entrainment and			hanically; mobili ing self-propelle			some substrate	•	v cause effects; ential for entrainment	
	over; exclusion			ing sen-propene imers; set up	u	removal o			nis scenario is for 0%	
	deflection confi			eline containmer	ıt		on on sandy	-	vater column;	
	to be used to pro	C		n areas with		•	oiled dock		vever, still perform	
	sensitive areas.		vacu	ium-trucks and		structures	; oiled debris		er column tracking,	
			skin	nmers.		removal.		and air monitoring.		

 $<sup>^{33}</sup>$  Required only when transferring cargo; underway allisions, no specific AMPD requirement, though a spill response would be undertaken.

<sup>149</sup> Hudson River Oil Spill Risk Assessment Volume 7: Spill Scenario Summaries

#### Tappan Zee 50-bbl Heavy Fuel Oil Spill (Summer-Low Tide) Effects

	Loca	tion	Sc	ource	V	olume		Oil Ty	ре	Season		Tide Stage	
Scenario Description	Tappa	n Zee	with	r Allision Bridge utment	4	50 bbl		avy Fu	_	Summer		Low	
Cn:II		Annu	al Prob	ability Any	where	in Hudson	Rive	er				ual Frequency 2015)	
Spill Probability	Spi	ll of Typ	e (Any `	Volume)	$S_{l}$	pill of Type	and	Volun	ne e	US		Hudson	
·		0.7	32			0.0	93			17.2		0	
Conditions	Lat/l	Lon	Relea	ase Rate		telease te/Time		Iodel l Durati		Winds		Water Temperature	
Conditions	41.0 -73.88	07195 8333	Instar	ntaneous		gust 2012 :00am		30 day	/S	SW / light (<4 kts)		81°F	
				Mass Ba	alance	at End of M	lodel	Run (	After 3	0 Days)		_	
	Fate	Surf	ace	Atmosp	here	Water Column	l	Sec	diment	Ashoro	e	Degraded	
	% 0.0% 8.1% 0.0% 0.0%									69.8%		22.1%	
SIMAP Modeling	bbl 0 4 0 0  Spatial Extent of Exposure over Threshold (Up to 3									35 11			
Results			Spatial	Extent of	Expos	ure over Th	resh	old (U	p to 30	Days After Sp	ill)		
		Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (Length)										_	
												Socioeconomic	
		(1 mg/l)         (0.001 mg/l)         (10 g/m²)         (0.01 g/m²)         (100 g/m²)         (1 g/m²)           <100 gal										8 mi	
		U			ire by	Shore Type				gical Threshol	ld)		
	Bee	drock		Jnconsolid Rock		Sand				or Timber		rtificial Shore	
	0.1	16 mi		4.68 mi		0 1	ni		(	).42 mi		0 mi	
F 1 . 1		Brac	kish/Est	tuarine W	etland	Habitats Ex	pose	d (Mil	les over	Ecological Th	resh	old)	
Ecological Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland	
Exposures	C	) mi		0.05 mi		0 1	ni			0 mi		0 mi	
		F								logical Threst			
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland	
	0 mi 0 mi 0 mi 0 mi									0 mi			
										onse Operatio			
Socioeconomic Impacts	of conce oil, inclu (about 5 would be Ferry, th may be e precaution	rn for soo ding resi miles). Re most af ough the experience	cioecono due and liverside fected or oiling o ed in oth ing adv	omic effects odor. SCA e parks, man in the west so of shorelines ther towns a	s; shore T oper rinas, b shore ir s would long th	efront marina ations and conteaches, industriands of Orangetown I likely be liver river. No	is, be leanu istry, n, an mited water	eaches, p wou comm d on th l to pat intake	parks, a ld be foot ercial protected ae east sl tchy area es would	and real estate valued on areas roperty, and shore from Slee	woul more orefi py H Add	ont real estate follow to Dobbs litional impacts fonal	

#### Tappan Zee 50-bbl Heavy Fuel Oil Spill (Summer-Low Tide) Response

			]	Response Equipme	nt and Plan Activ	vation				
	NCP and		Tier l	Response Requiren	nents	GR		Ss Activated ays)		
	USCG Type	Tier 1	1	Tier 2	Tier 3	Rail M	liles	River Miles		
	Not major AMPD <sup>34</sup>	n/a		n/a	n/a	n/a	ı	8 river miles Mile 24-32 2016-98 to 2016-91		
		R	espons	se Overview: Expe	cted Outcomes and Challenges					
	Protective B	Booming	Med	chanical Recovery	Shoreline (	Cleanup	Otl	Other Challenges		
Spill Response	Average river of 0.7 kt will reduce ffectiveness, containment are diversionary be configurations angled to preventrainment an over; exclusion deflection confit to be used to presensitive areas.	currents of ace boom and coom to be cent d splash and figurations rotect	antici evapo sprea reduc be red mech floati skimi shore boom	8% evaporation is ipated thus pration and rapid ding will minimally be amount that can covered lanically; mobilize ng self-propelled mers; set up line containment in areas with lim-trucks and mers.	About 70% is to cause shore contamination	anticipated line so ould be for noreline tion.  F; wetland e substrate o sandy dock	heating signific wetlan challer wetlan respon effects entrain scenari water of still pe	nability during a g oil spill is not cant danger, d access may be nge; disturbance of ds during se may cause ; potential for ment in this io is for 0% in column; however, reform water n tracking, and air		

 $<sup>^{34}</sup>$  Required only when transferring cargo; underway allisions, no specific AMPD requirement, though a spill response would be undertaken.

<sup>151</sup> Hudson River Oil Spill Risk Assessment Volume 7: Spill Scenario Summaries

### Tappan Zee 50-bbl Heavy Fuel Oil Spill (Winter-High Tide) Effects

	Loca	tion	So	ource	V	olume		Oil Ty	уре		Season		Tide Stage
Scenario Description	Tappa	n Zee	with	r Allision Bridge utment		50 bbl	Не	avy Fu	ıel Oil		Winter		High
Spill		Annu	al Prob	ability Any	where	in Hudson	Rive	er		]			ual Frequency 2015)
Probability	Spi	ll of Typ	e (Any	Volume)	$S_1$	pill of Type	and	Volun	ne		US		Hudson
		0.7	732			0.0	)93				17.2		0
Conditions	Lat/l		Relea	ase Rate	Da	Release te/Time		Iodel I Durat			Winds		Water Temperature
Conditions	41.07 -73.88		Instar	ntaneous	8	uary 2012 :00am		30 da			uth / modera (4-18 kts)	ate	35°F
				Mass Ba	alance	at End of M	Iodel	Run (	(After 3	0 D	ays)		
	Fate	Surf	ace	Atmospl	here	Water Column	1	Sec	diment		Ashore	!	Degraded
	%	0.0	%	6.1%	1	0.0%		(	0.0%		71.7%		22.2%
SIMAP Modeling	bbl 0 3 0 0 36  Spatial Extent of Exposure over Threshold (Up to 30 Days After Spill)										11		
Results			Spatial	Extent of	Expos	ure over Th	resh	old (U	p to 30	Day	ys After Sp	ill)	
	Water	Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (Length)											
		$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$											Socioeconomic (1 g/m <sup>2</sup> )
	10 mi			00 gal		mi <sup>2</sup> -days		14 mi <sup>2</sup>			1 mi		9 mi
			Shorel	ine Exposi	ire by	Shore Type	(Mi	les ove	er Ecolo	gica	al Threshol	d)	
	Bee	drock	Ţ	Jnconsolida Rock	ated	Sand 1	Beac	h	Mud	or	Timber	A	artificial Shore
	C	) mi		0.94 mi		0 1	mi			0.1	mi		0 mi
Factoriant		Brac	kish/Est	tuarine We	etland	Habitats Ex	cpose	ed (Mi	les over	Ec	ological Th	resh	nold)
Ecological Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal			mites land		nrub/Scrub and rested Wetland
Exposures	C	) mi		0 mi		0 1	mi			0 1	ni		0 mi
		F				itats Expos							
	Cattail Marsh Upper Intertidal Lower Intertidal Phragmites Shrub/Scrub and Mix Wetland Forested Wetland												
	C	) mi		0 mi		0 1	mi			0 ı	mi		0 mi
						c Impacts fi							
Socioeconomic Impacts	of conce oil, inclu (about 1 would be Hastings water in	ern for soo iding resi mile). Ri e most af s-on-Hud takes wou	cioecono due and iverside fected of son to Y	omic effects odor. SCA parks, mari n the west s onkers. Ad ffected. Add	s; shore T oper lnas, be shore fi ditional	efront maring ations and c eaches, indus- com Nyack to il impacts m	as, be leanu stry, o Alp ay be ary fi	eaches, ip wou comme oine, N e exper shing a	parks, a ld be for ercial pro lew Jerse ienced i	and cuse oper ey, a	real estate ved on areas a rty, and sho and on the e her towns a	voul more refre ast s long	above the level d be affected by e heavily oiled ont real estate shore from g the river. No instituted for

#### Tappan Zee 50-bbl Heavy Fuel Oil Spill (Winter-High Tide) Response

			J	Response Equipmen	nt and Plan Activa	tion			
	NCP and		Tier	Response Requiren	nents	GR		Ss Activated ays)	
	USCG Type	Tier	1	Tier 2	Tier 3	Rail N	Ailes	River Miles	
	Not major AMPD <sup>35</sup>	n/a		n/a	n/a	n/	a	3 river miles Mile 24-21 2016-97 to 2016-98	
		R	espons	e Overview: Expec	ted Outcomes and	Challeng	es		
	Protective B	Booming	Med	chanical Recovery	Shoreline Cl	eanup	Other Challenges		
Spill Response	Average river of 0.7 kt will reduce ffectiveness, containment and diversionary be configurations angled to prevent entrainment and over; exclusion deflection control to be used to propose sensitive areas.  Potential ice comay negatively boom performation.	nd oom to be ent d splash and figurations rotect	antici evapo spread reduc be rec mech floatin skimi shore boom vacuu skimi Poten may i	6% evaporation is pated thus pated thus pration and rapid ding will minimally e amount that can covered anically; mobilizeing self-propelled mers; set up line containment areas with mintrucks and mers.  tial ice conditions negatively impact mer operations	About 72% is an to cause shoreling contamination so anticipation would a significant shoreling cleanup operation as the cleanup operation of the perform SCAT; flushing; some some removal due to penetration on some beaches; oiled distructures; oiled removal.	ne oo	heating signific wetland challen wetland respons effects; entrains scenario water c still per	ability during a goil spill is not eant danger, d access may be ge; disturbance of ds during se may cause potential for ment in this o is for 0% in olumn; however, form water a tracking, and air ring.	

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 $<sup>^{35}</sup>$  Required only when transferring cargo; underway allisions, no specific AMPD requirement, though a spill response would be undertaken.

#### Tappan Zee 50-bbl Heavy Fuel Oil Spill (Winter-Low Tide) Effects

	Loca	tion	So	ource	V	olume		Oil Ty	pe	Se	eason		Tide Stage
Scenario Description	Tappa	n Zee	with	r Allision Bridge atment	5	50 bbl	Не	avy Fu	el Oil	W	Vinter		Low
C:11		Annu	al Prob	ability Any	where	in Hudson	Rive	er		Hist			ual Frequency 2015)
Spill Probability	Spi	ll of Typ	e (Any '	Volume)	Sı	oill of Type	and	Volun	1e		US		Hudson
-		0.7	32			0.0	93			1	17.2		0
Conditions	Lat/I		Relea	se Rate	Da	elease te/Time		Iodel l Durati			Vinds		Water Temperature
Conditions	41.07 -73.88		Instan	taneous		uary 2012 :30am		30 day	'S		/ modera 18 kts)	ite	35°F
				Mass Ba	alance	at End of M	lodel	Run (	After 3	0 Days)	)		
	Fate	Surf	ace	Atmosp	here	Water Column	l	Sec	diment		Ashore		Degraded
	% 0.0% 6.1% 0.0% 0.0%									71.7%		22.2%	
SIMAP Modeling	bbl   0   3   0   0     Spatial Extent of Exposure over Threshold (Up to 30 Da									11			
Results			Spatial	Extent of						Days A			
		Water (Volume) – Ecological Surface (Area x Days Exposed) Shoreline (Length)  Whole Oil Dissolved Feelegical Socioeconomic Feelegical Socioeconomic										` 0 /	
		$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$											
	10 mi			00 gal		mi2-days		08 mi2			2 mi		5 mi
			Shorel	ine Exposi	ire by	Shore Type	(Mi	les ove	r Ecolo	gical Tl	hresholo	d)	
	Bee	drock	J	Inconsolid Rock	ated	Sand 1	Beac	h	Mud	or Tim	ıber	A	rtificial Shore
	0.1	16 mi		1.3 mi		0 1	mi		(	0.16 mi			0 mi
Ecological		Brac				Habitats Ex							
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmite Vetland			rub/Scrub and rested Wetland
LAposures	C	) mi		0 mi		0 1	ni			0 mi			0 mi
		F				itats Expos							
	Cattail Marsh Upper Intertidal Lower Intertidal Phragmites Shrub/Scrub and Mix Wetland Forested Wetland												
	C	) mi		0 mi		0 1	ni			0 mi			0 mi
						Impacts fi							
Socioeconomic Impacts	of conce oil, inclu (about 2 would be Hastings water int	rn for soo iding resi miles). Re most af a-on-Huds takes wou	cioeconordue and diverside fected or son to Y ald be af	omic effects odor. SCA parks, man the west st onkers. Ad fected. Add	s; shore T oper- rinas, b shore fr ditional	front marina ations and c eaches, indu om Nyack t I impacts ma	as, be leanu istry, o Alp ay be ary fi	eaches, p wou comm pine, N experi shing a	parks, a ld be for ercial p ew Jers ienced i	and real cused or roperty, ey, and on other t	estate wan areas mand sho on the eatowns al	oulonore orefr ast s	above the level d be affected by e heavily oiled cont real estate shore from the river. No instituted for

#### Tappan Zee 50-bbl Heavy Fuel Oil Spill (Winter-Low Tide) Response

			]	Response Equipme	nt and Plan Activ	vation		
	NCP and			Response Requirer			Ps/ GRS (7 d	s Activated ays)
	USCG Type	Tier 1	1	Tier 2	Tier 3	Rail M	liles	River Miles
	Not major AMPD <sup>36</sup>	n/a		n/a	n/a	n/a		3 river miles Mile 24-22 2016-96 to 2016-97
		R	espons	se Overview: Expe	cted Outcomes an	d Challeng	es	
	Protective B	Booming	Med	chanical Recovery	Shoreline (	Cleanup	Oth	ner Challenges
Spill Response	Average river of 0.7 kt will redu effectiveness, containment ar diversionary be configurations angled to preve entrainment an over; exclusion deflection cont to be used to p sensitive areas.  Potential ice comay negatively boom performations	nd oom to be ent d splash and figurations rotect	anticievapo spread reduction mech floati skimmi shore boom vacuu skimmi Poter may i	6% evaporation is ipated thus pration and rapid ding will minimally the amount that can covered annically; mobilizeing self-propelled mers; set up eline containment in areas with the containment in a containment	About 72% is a to cause shorel contamination anticipation we a significant shocker of the cleanup operated Perform SCAT flushing; some removal due to penetration on beaches; oiled structures; oiled removal.	line so ould be for noreline ion. T; wetland e substrate o sandy dock	heating signific wetland challend wetland may can potenti in this in water however	ability during a goil spill is not cant danger, d access may be age; disturbance of ds during response ause effects; al for entrainment scenario is for 0% er column; er, still perform column tracking, monitoring.

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 $<sup>^{36}</sup>$  Required only when transferring cargo; underway allisions, no specific AMPD requirement, though a spill response would be undertaken.

#### Yonkers Anchorage 155,000-bbl Gasoline Spill

### Yonkers Anchorage 155,000-bbl Gasoline Spill (Spring-High Tide) Effects

	Loca	tion	So	ource	V	olume		Oil Ty	ре	Season		Tide Stage
Scenario Description	Yonl Ancho		collisio	nnker on/allision chorage	155	5,000 bbl		Gasoli	ne	Spring		High
g.·n		Annu	al Proba	ability Any	where	in Hudson	Rive	er			Annu 000-2	al Frequency (015)
Spill Probability	Spi	ll of Typ	e (Any `	Volume)	S	pill of Type	and	Volun	ne	US		Hudson
v		0.7	732			0.000	00015	5		0		0
C 122	Lat/l	Lon	Relea	se Rate		Release ite/Time		Iodel I Durati		Winds		Water Temperature
Conditions	40.97 -73.90			0 bbl/hr r 4 hrs		pril 2012 :00am		30 day	ys	North / mode (10-20 kts		50°F
				Mass Ba	alance	at End of N	<b>Iode</b>	l Run	(After 3	0 Days)		
	Fate	Surf	face	Atmospl	here	Water Colum	1	Sec	diment	Ashor	e	Degraded
	%	0.0	)%	91.89	6	0.1%		(	0.1%	0.0%		3.9%
SIMAP Modeling	bbl	C	)	142,36	56	122			226	48		6,109
Results										Days After S <sub>l</sub>	pill)	
		· (Volum		U		face (Area x			-			Length)
		$(1 \text{ mg/l})$ $(0.001 \text{ mg/l})$ $(10 \text{ g/m}^2)$ $(0.01 \text{ g/m}^2)$ $(100 \text{ g/m}^2)$										Socioeconomic (1 g/m²)
	82,445 mil gal 274,544 mil gal 7 mi <sup>2</sup> -days 10 mi <sup>2</sup> -days											63 mi
						Shore Type	e (Mi	iles ove	er Ecolo	gical Thresho	old)	
	Bee	drock	, l	Inconsolida Rock	ated	Sand	Beac	h	Mud	or Timber	A	rtificial Shore
	C	) mi		0 mi			mi			0 mi		0 mi
Ecological		Brac								Ecological Tl		
Shoreline	Salt	marsh	U	pper Inter Mix	tidal	Lower I	ntert [ix	ıdal		ragmites Vetland		rub/Scrub and ested Wetland
Exposures	0.2	26 mi		0 mi		0 1	mi			0 mi		0 mi
		J								ological Thres		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower I	ntert ix	idal		ragmites Vetland		rub/Scrub and ested Wetland
	0 mi 0 mi 0 mi										0 mi	
						_		_	_	onse Operati		
Socioeconomic Impacts	days; even of popul above th would be	acuations ated area e level of e affected	s and pressed sould of concernate the concernate th	ecautionary cause effec n for socion including r	cleara ts on c econon residue	nce zones m ommunities nic effects; s and odor. S	ight and l hore CAT	cause fousines front moperat	further in sses. 63 narinas, l narinas and	miles of shorel beaches, parks,	el trafi line w , and i d be f	fic. Evacuation ould be oiled real estate occused on areas
	shorefront real estate would be most affected on the west shore from Alpine to Hoboken, New Jersey, and on the east shore from Yonkers to Manhattan. Additional impacts may be experienced in other towns along the river. No water intakes would be affected. Additional precautionary fishing advisories would likely be instituted for certain parts of the river in the vicinity of the spill.										er tov	

## Yonkers Anchorage 155,000-bbl Gasoline Spill (Spring-High Tide) Response

Rooponico			R	esponse Equipmen	t and Plan Activatio	n		
	NCP and		Tier	Response Requirer	ments	G		Ss Activated ays)
	USCG Type	Tier 1 (24	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/d 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage		n/a	18 river miles Mile 18-0 2016-113
				e Overview: Expect	hallenges			
	Protective E			nanical Recovery	Shoreline Clear	-		r Challenges
Spill Response	Average river of the large river	nd oom to be ent d splash n and figurations rotect .  by nand to not oline ent to vapor and	rapid s reduce be reco mecha floatin skimm shoreli boom s vacuur skimm Consic Comm perfori operati pruden	nically; mobilize g self-propelled hers; set up ine containment areas with m-trucks and hers.  Heration by Unified hand of not ming skimming hions may be not in light of the hial flammability	Minimal % is antice to cause shoreline contamination. Per SCAT; wetland flus some substrate rem due to penetration of sandy beaches; contaminated debri removal; BTEX resembles may remain in short sediment.	form shing; oval on s	Flammab gasoline extremely danger as vapors to public he in the spi public to danger; ef firefighti on scene wetland a challenge wetlands may caus potential of small column r water int concerns spilled me evaporatial atmosphe water col	spill is an sy significant is are high BTEX to responder and ealth and safety ill areas; notify potential fire ensure in gresources are and mobilized; access may be es; disturbance of during response is effects; for entrainment in water may not lead to ake and fish kill since most

#### Yonkers Anchorage 155,000-bbl Gasoline Spill (Spring-Low Tide) Effects

			,					` '				
Consider	Loca	tion		ource	V	olume		Oil Ty	ype	Season		Tide Stage
Scenario Description	Yon Anche		collisio	anker on/allision chorage	155	5,000 bbl		Gasol	ine	Spring		Low
Spill		Annu	al Prob	ability Any	where	in Hudson	Rive	er				ual Frequency 2015)
Probability	Spi	ll of Typ	e (Any	Volume)	$S_{]}$	pill of Type	and	Volun	ne	US		Hudson
		0.7	732			0.000	00015	5		0		0
Conditions	Lat/		Relea	ase Rate	Da	delease te/Time	te/Time Duration			Winds		Water Temperature
Conditions	40.9° -73.9			50 bbl/hr er 4 hrs		7 April 2012 10:00am 30 days North / moderate (4-16 kts)						50°F
				Mass Ba	alance		Model Run (After 3			0 Days)		
	Fate	Surf	face	Atmosp	here	Water Column		Se	diment	Ashor	e	Degraded
	%	0.0	)%	93.49	6	0.2%		(	0.1%	0.1%		3.2%
SIMAP Modeling	bbl	3 144,807 233 137							82		4,923	
Results			Spatial	Extent of	Expos	ure over Th	resh	old (U	p to 30	Days After Sp	oill)	
		r (Volum				ace (Area x						(Length)
		le Oil ng/l)		ssolved 01 mg/l)	(1	cological 10 g/m²)	(	(0.01 g		Ecologica (100 g/m <sup>2</sup>		Socioeconomic (1 g/m²)
	60,959	mil gal	343,29	91 mil gal	12	mi <sup>2</sup> -days	1	6 mi <sup>2</sup> -	days	1 mi		83 mi
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)										
	Be	Bedrock			ated	Sand 1	Beac	h	Mud	or Timber	A	rtificial Shore
	(	) mi		0.05 mi	i 0 mi				0.1 mi 0 mi			
Ecological		Brac				1				Ecological Th		
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower Intertidal Mix				ragmites Vetland		rub/Scrub and rested Wetland
Laposures	0.0	68 mi		0 mi		0 1	mi			0 mi		0 mi
		F								logical Thresl		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland
	(	) mi		0 mi		0 1				0 mi		0 mi
	Potential Socioeconomic Impacts from Spill and Response Operations  Response operations may cause major impacts to ports in Albany and throughout river for at least several											
Socioeconomic Impacts	days; ev of popul above th would be more her shorefro the east river. No	acuations ated area are level of e affected avily oile nt real es shore from to water in	s and press could of concernd by oil, and (about tate would makes well and takes	ecautionary cause effect in for socioe including r t 1 mile). R ald be most ers to Manl ould be affe	clearants on coeconomics esidue iversidue affecte nattan.	once zones minimumities and odor. So e parks, mard on the we Additional i	ight of and be horef CAT inas, st sho mpac recau	cause fousines ront m operat beach ore front ets may	further in sees. 83 narinas, b ions and es, indus m Alpin be expe	npacts to vesse miles of shorel peaches, parks, cleanup would stry, commercia	I trafine wand do be all property New er to	fic. Evacuation vould be oiled real estate focused on areas operty, and Jersey, and on wns along the

#### Yonkers Anchorage 155,000-bbl Gasoline Spill (Spring-Low Tide) Response

		·	R	esponse Equipment	t and Plan Activatio	n		•
	NCP and		Tier	Response Requirer	nents	G	RPs/ GRS (7 d	Ss Activated ays)
	USCG Type	Tier 1 (24	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/d 3,750 bbl s	800 per system lay torage	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage ed Outcomes and C		n/a	22 river miles Mile 22-0 2016-98 to 2016-113
	Duntantina I			-	I		n Challangas	
	Protective I			nanical Recovery	Shoreline Clear			r Challenges
	Average river >1 kt will redu effectiveness,		rapid s	vaporation and spreading will amount that can	Minimal % is antic to cause shoreline contamination. Per	•	gasoline	bility during a spill is an y significant
	containment a	nd	be reco		SCAT; wetland flu			s are high
	diversionary b			nically; mobilize	some substrate rem	oval	BTEX v	apors to
	configurations			g self-propelled	due to penetration	health an		er and public
Spill Response	angled to preve			ers; set up	sandy beaches; contaminated debri			nd safety in the
	entrainment an over; exclusion			areas with	removal; BTEX res			as; notify public tial fire danger;
	deflection con			n-trucks and	may remain in short			refighting
	to be used to p		skimm		sediment.			s are on scene
	sensitive areas						and mob	ilized; wetland
				deration by Unified				nay be challenge;
	Consideration			and of not				nce of wetlands
	Command to n			ming skimming				esponse may
	containing gas might be prude			ions may be nt in light of the				fects; potential inment of small
	eliminate gas v			ial flammability				ter column may
	concentrations		issues.	•				to water intake
	potential flams	nable					and fish	kill concerns
	incidents.							st spilled
		ionis.						is evaporating
								atmosphere;
								water column
							tracking, monitori	
					l		momtori	ng.

#### Yonkers Anchorage 155,000-bbl Gasoline Spill (Summer-High Tide) Effects

							_	<u> </u>					
Camania	Loca	tion		ource	V	olume		Oil Ty	pe	Season		Tide Stage	
Scenario Description	Yonl Ancho		collisio	anker on/allision chorage	155	5,000 bbl		Gasoli	ine	Summer		High	
Spill		Annu	al Prob	ability Any	where	in Hudson	Rive	er				ual Frequency 2015)	
Probability	Spi	ll of Typ	e (Any `	Volume)	$S_{]}$	pill of Type	and	Volun	ne	US		Hudson	
		0.7	732			0.000	00015	5		0		0	
Conditions	Lat/	Lon	Relea	ase Rate	Da	Release te/Time		Model Run Duration		Winds		Water Temperature	
Conditions	40.97 -73.90	-		0 bbl/hr r 4 hrs	1 August 2012 4:00pm			30 day	ys	SW / light (<4 kts)		81°F	
				Mass Ba	alance		Iodel Run (After 3			0 Days)			
	Fate	Surf	ace	Atmospl	here	Water Column	ı	Se	diment	Ashor	e	Degraded	
	%	0.0	1%	93.9%	6	1.4%		(	0.1%	0.0%		4.6%	
SIMAP Modeling	bbl	0		145,47	70	2,237			105	54 7,134			
Results		Spatial Extent of				ure over Th	resh	old (U	p to 30				
		· (Volum				face (Area x						(Length)	
	Whol (1 n	le Oil ng/l)		ssolved 01 mg/l)	(1	cological l0 g/m²)	(	(0.01 g		Ecologica (100 g/m <sup>2</sup> )		Socioeconomic (1 g/m²)	
	64,687	mil gal	301,64	48 mil gal 51 mi <sup>2</sup> -days 52 mi <sup>2</sup> -days					3 mi		31 mi		
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)											
	Bedrock			Jnconsolida Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	artificial Shore	
	(	) mi		2.76 mi	0 mi				0.1 mi		0 mi		
Ecological		Brac			tland Habitats Exposed (Miles over								
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal Lower Intertidal P Mix				ragmites Vetland		nrub/Scrub and rested Wetland		
	0.2	21 mi		0 mi		0 1				).42 mi		0 mi	
		I								logical Thresl			
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		nrub/Scrub and prested Wetland	
	(	) mi		0 mi		0 1	mi			0 mi		0 mi	
	Potential Socioeconomic Impacts from Spill and Response Operations  Response operations may cause major impacts to ports in Albany and throughout river for at least sever												
Socioeconomic Impacts	days; evo of popul above the would be more her shorefro Jersey, a in other	acuations ated area are level of e affected avily oile nt real es and on the towns alo	s and press could of concern by oil, d (about tate would be east shoon the r	cautionary cause effect in for socioe including r t 3 miles). I ald be most ore from H river. No wa	clearants on concernment of the conomic esidue Riversidue affecte astings ater int	nce zones mi ommunities a nic effects; sl and odor. So de parks, ma ad on the we on-Hudson	ight of and be horef CAT arinas st sho to Rinas be after the after	cause fouriness ront m operate, beach ore from iverdal fected.	urther in ses. 31 arinas, b ions and nes, indu m Orang e. Addition	mpacts to vesse miles of shorel peaches, parks, I cleanup would astry, commerce getown to Englational impacts in anal precautions	el trafine wand do be cial pewood	ffic. Evacuation vould be oiled real estate focused on areas	

### Yonkers Anchorage 155,000-bbl Gasoline Spill (Summer-High Tide) Response

Response			R	esponse Equipment	t and Plan Activatio	n		
	NCP and		Tier	Response Requiren	nents	G		Ss Activated ays)
	USCG Type	Tier 1 (2	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/c 3,750 bbl s	300 per system lay	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	1	n/a	7 river miles Mile 22-15 2016-98 to 2016-103
		R	esponse	Overview: Expecte	ed Outcomes and C	halleng		
	Protective I			hanical Recovery	Shoreline Clear			r Challenges
Spill Response	Average rivered >1 kt will reduce ffectiveness, containment and diversionary be configurations angled to preventrainment and over; exclusion deflection contained to be used to persensitive areas.  Consideration Command to a containing gas might be prude eliminate gas very concentrations potential flammincidents.	nd oom to be ent ad splash n and figurations rotect .  by Unified not ooline ent to vapor and	rapid s reduce be recomecha floatin skimm shoreli boom vacuus skimm Consid Comm perform operat pruder	nically; mobilize g self-propelled hers; set up hine containment hareas with har-trucks and hers.  Heration by Unified hand of not hand of not hing skimming hions may be hat in light of the hial flammability	Minimal % is antice to cause shoreline contamination. Per SCAT; wetland flusome substrate remedue to penetration and beaches; contaminated debriremoval; BTEX remay remain in short sediment.	form shing; noval on	gasoline extremel danger a BTEX v responde health ar spill area to potent ensure fi resource and mob access m disturbat during re cause eff for entra >1 % in may not intake ar concerns spilled n evaporat atmosph water co	bility during a spill is an ly significant s are high apors to er and public and safety in the as; notify public tial fire danger; refighting s are on scene dilized; wetland hay be challenge; ace of wetlands esponse may fects; potential inment of small water column lead to water and fish kill s since most material is ing into the ere; perform lumn tracking, monitoring.

#### Yonkers Anchorage 155,000-bbl Gasoline Spill (Summer-Low Tide) Effects

	Loca	tion	So	Season		Tide Stage							
Scenario Description	Yonl Ancho		collisio	anker on/allision chorage	155	5,000 bbl		Gasoli	ne	Summer		Low	
Spill		Annu	al Prob	ability Any	where	in Hudson	Rive	er				ual Frequency 2015)	
Probability	Spi	ll of Typ	e (Any '	Volume)	S	pill of Type	and	Volun	ne	US		Hudson	
-		0.7	732			0.000	00015	5		0		0	
Conditions	Lat/			ase Rate	Da	Release te/Time		Aodel l Durati		Winds		Water Temperature	
Conditions	40.97 -73.90		,	0 bbl/hr r 4 hrs		gust 2012 :00am		30 day	/S	SW / light (<4 kts)		81°F	
				Mass Ba	alance	at End of M	Iodel	Run (After 30 l		0 Days)			
	Fate	Surf	ace	Atmospl	here	Water Colum	ì	Sec	diment	Ashor	e	Degraded	
	%	0.0	1%	94.19	6	1.4%		(	0.1%	0.0%		4.3%	
SIMAP Modeling	bbl	0	0 145,858 2,227 161						45		6,708		
Results					Expos	ure over Th	resh	old (U	p to 30	Days After Sp	ill)		
		· (Volum			osed)			(Length)					
	Whol (1 n	le Oil ng/l)		ssolved 01 mg/l)		cological l0 g/m²)	Socioecono (0.01 g/m²			Ecologica (100 g/m <sup>2</sup> )		Socioeconomic (1 g/m²)	
	61,736	mil gal	227,95	57 mil gal	37	mi <sup>2</sup> -days	3	8 mi <sup>2</sup> -c	lays	2 mi		23 mi	
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)											
	Be	Bedrock Unconsolida Rock			ated	Sand	Beac	h	Mud	or Timber	A	rtificial Shore	
	(	) mi		1.77 mi	0 mi 0					0.21 mi 0 mi			
Ecological		Brac				1				er Ecological Th			
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland	
Exposures	(	) mi		0 mi		0 1	mi		(	0.05 mi		0 mi	
		I								logical Thresl			
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In	ntert ix	idal		ragmites Vetland		rub/Scrub and rested Wetland	
	(	) mi		0 mi		0 1	mi			0 mi		0 mi	
		Potential Socioeconomic Impacts from Spill and Response Operations  Response operations may cause major impacts to ports in Albany and throughout river for at least several											
												east several ffic. Evacuation	
										miles of shorel			
Socioeconomic										peaches, parks,			
Impacts												focused on areas	
	more heavily oiled (about 2 miles). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate would be most affected on the west shore from Nyack to Fort Lee, New Jersey, and on												
	the east shore from Hastings-on-Hudson to Riverdale. Additional impacts may be experienced in other towns along the river. No water intakes would be affected. Additional precautionary fishing advisories would likely												
										ary fishing adv	isorie	es would likely	
	o mon	instituted for certain parts of the river in the vicinity of the spill.											

# Yonkers Anchorage 155,000-bbl Gasoline Spill (Summer-Low Tide) Response

-			R	esponse Equipment	t and Plan Activatio	n			
	NCP and		Tier	Response Requirer	nents	G	RPs/ GRS (7 d	Ss Activated ays)	
	USCG Type	Tier 1 (24	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles	
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/c 3,750 bbl s	300 per system lay torage	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage ed Outcomes and C		n/a	7 river miles Mile 22-10 2016-98 to 2016-105	
	Duotaativa I				Shoreline Clear				
	Average river			vaporation and	Minimal % is antic			bility during a	
	>1 kt will redu effectiveness,		rapid s	spreading will amount that can	to cause shoreline contamination. Per	form	gasoline extremel	spill is an y significant	
	containment a		be reco		SCAT; wetland flu			s are high	
	diversionary b configurations			nically; mobilize g self-propelled	some substrate rem			apors to er and public	
Spill Response	angled to prev			g sen-propened ers; set up	due to penetration of sandy beaches;			nd safety in the	
Spin Response	entrainment ar			ine containment	contaminated debri	is		as; notify public	
	over; exclusion		boom	areas with	removal; BTEX res	sidue	to potent	ial fire danger;	
	deflection con			m-trucks and	may remain in shor	re		refighting	
	to be used to p		skimm	iers.	sediment.			s are on scene	
	sensitive areas	•		1 1 11 1				ilized; wetland	
	Consideration	by Unified		deration by Unified and of not				nay be challenge;	
	Command to r			ming skimming				esponse may	
	containing gas			ions may be				fects; potential	
	might be prude			nt in light of the				inment of small	
	eliminate gas v		potent	ial flammability				water column	
	concentrations		issues.					lead to water	
	potential flami incidents.	ntial flammable lents.						nd fish kill	
	incidents.							s since most naterial is	
								ing into the	
								ere; perform	
								lumn tracking,	
							and air n	nonitoring.	

#### Yonkers Anchorage 155,000-bbl Gasoline Spill (Winter-High Tide) Effects

	Loca	tion	So	ource	V	olume		Oil Ty	pe	Season		Tide Stage
Scenario Description	Yonl Ancho		collisio	anker on/allision chorage	155	5,000 bbl		Gasoli	ine	Winter		High
C:11		Annu	al Prob	ability Any	where	in Hudson	Rive	er				ual Frequency 2015)
Spill Probability	Spi	ll of Typ	e (Any '	Volume)	Sı	pill of Type	and	Volun	ne e	US		Hudson
-		0.7	732			0.000	00015	5		0		0
Conditions	Lat/		Relea	se Rate	Da	delease te/Time		Aodel l Durati		Winds		Water Temperature
Conditions	40.97 -73.90		,	0 bbl/hr r 4 hrs	1 January 2012 8:00am 30 days				ys	South / moder (4-18 kts)	rate	35°F
				Mass Ba	alance	at End of M	lodel	Run (	After 3	0 Days)		
	Fate	Surf	ace	Atmosp	here	Water Column	1	Sec	diment	Ashor	e	Degraded
	%	0.0	1%	93.89	6	0.3%		(	0.2%	0.1%		4.1%
SIMAP Modeling	bbl	5 145,461 441 322							322	204		6,291
Results		Spatial Extent of				ure over Th	resh	old (U	p to 30	Days After Sp	ill)	
		· (Volum				ace (Area x						(Length)
	Whol (1 n		-	ssolved 01 mg/l)		cological 10 g/m²)		cioeco (0.01 g		Ecologica (100 g/m <sup>2</sup>		Socioeconomic (1 g/m²)
	68,167	mil gal	410,86	66 mil gal	6 mi <sup>2</sup> -days 8 mi <sup>2</sup> -days				ays	3 mi		103 mi
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)										
	Be	drock	Į	Inconsolid Rock	ated	Sand 1	Beac	h	Mud	or Timber	A	rtificial Shore
	(	) mi		1.72 mi					0.16 mi 0 mi			
Ecological		Brac				1				Ecological Th		
Shoreline Exposures	Salt	marsh	U	pper Inter Mix	tidal Lower Intertidal Mix			idal		ragmites Vetland		rub/Scrub and rested Wetland
2.1posu1 es	0.8	88 mi		0 mi		0 1				0 mi		0 mi
		- I								logical Thresh		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		rub/Scrub and rested Wetland
	(	) mi		0 mi		0 1	mi			0 mi		0 mi
	Potential Socioeconomic Impacts from Spill and Response Operations  Response operations may cause major impacts to ports in Albany and throughout river for at least several											
												east several fic. Evacuation
												would be oiled
Socioeconomic	above th	e level of	f conceri	n for socioe	econom	ic effects; sl	oref	ront m	arinas, l	beaches, parks,	and	real estate
Impacts												focused on areas
		more heavily oiled (about 3 miles). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate would be most affected on the west shore from Orangetown to Alpine, New Jersey, and										
	on the east shore from Yonkers to Riverdale. Additional impacts may be experienced in other towns along the											
	river. No water intakes would be affected. Additional precautionary fishing advisories would likely be instituted for certain parts of the river in the vicinity of the spill									ikely be		
	instituted for certain parts of the river in the vicinity of the spill.											

# Yonkers Anchorage 155,000-bbl Gasoline Spill (Winter-High Tide) Response

-			R	esponse Equipment	t and Plan Activatio	n		
	NCP and		Tier	Response Requirer	nents	G	RPs/ GRS (7 d	Ss Activated ays)
	USCG Type	Tier 1 (24	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/d 3,750 bbl s	800 per system lay torage	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage		n/a	4 river miles Mile 21-17 2016-98 to 2016-101
				•	ed Outcomes and Cl		~ · ·	
	Protective I			nanical Recovery	Shoreline Clear	ıup		r Challenges
	Average river >1 kt will redu effectiveness,		rapid s	vaporation and spreading will amount that can	Minimal <1% is anticipated to cause shoreline contamin		gasoline	oility during a spill is an y significant
	containment as		be reco		Perform SCAT; we			s are high
	diversionary b			nically; mobilize	flushing; some sub	strate	BTEX v	
a p	configurations			g self-propelled	removal due to			er and public
Spill Response	angled to preve			ers; set up ine containment	penetration on sand			nd safety in the
	entrainment an over; exclusion			areas with	beaches; contamina debris removal; BT			as; notify public tial fire danger;
	deflection con			n-trucks and	residue may remair			refighting
	to be used to p		skimm		shore sediment.			s are on scene
	sensitive areas						and mob	ilized; wetland
			Consid	deration by Unified			access m	nay be challenge;
	Consideration			and of not				nce of wetlands
	Command to n			ming skimming			during re	esponse may
	containing gas			ions may be				fects; potential
	might be prude eliminate gas v			nt in light of the ial flammability				inment of small water column
	concentrations		issues.	•				lead to water
	potential flam		issues.					nd fish kill
	incidents.		Potent	ial ice conditions				s since most
		ients.		egatively impact				naterial is
	Potential ice co		skimm	ing operations.		evaporating into the		
	may negatively							ere; perform
	boom deploym	nent.						lumn tracking, nonitoring.
					l		and an ii	nomornig.

#### Yonkers Anchorage 155,000-bbl Gasoline Spill (Winter-Low Tide) Effects

	Loca	tion	So	ource	V	olume	ume Oil Type			Season		Tide Stage
Scenario Description	Yonl Ancho		collisio	anker on/allision chorage	155	5,000 bbl		Gasoli	ne	Winter		Low
C::11		Annu	al Proba	ability Any	where	in Hudson	Rive	er				ual Frequency 2015)
Spill Probability	Spi	ll of Typ	e (Any \	Volume)	Sı	pill of Type	and	Volun	ne	US		Hudson
		0.7	732			0.000	00015	5		0		0
Conditions	Lat/		Relea	se Rate	Da	delease te/Time		Aodel l Durati		Winds		Water Temperature
Conditions	40.97 -73.90		,	0 bbl/hr r 4 hrs	1 January 2012 2:30am 30 days			/S	South / moders (4-18 kts)	ate	35°F	
				Mass Ba	alance	at End of M	lodel	Run (	After 3	0 Days)		_
	Fate	Surf	ace	Atmosp	here	Water Column	1	Sec	diment	Ashore	e	Degraded
	%	0.0	1%	93.19	6	0.3%		(	0.2%	0.1%		5.0%
SIMAP Modeling	bbl								199		7,677	
Results	Spatial Extent of									Days After Sp	ill)	
		Water (Volume) - Ecological				ace (Area x		-				(Length)
	Whol (1 n			ssolved 01 mg/l)		cological 10 g/m²)		cioeco: (0.01 g		Ecological (100 g/m <sup>2</sup> )		Socioeconomic (1 g/m²)
	66,833	mil gal	431,35	54 mil gal	8 r	ni <sup>2</sup> -days	1	0 mi <sup>2</sup> -c	lays	2 mi		95 mi
		Shoreline Exposure by Shore Type (Miles over Ecological Threshold)										
	Be	Bedrock		Inconsolid Rock	ated	Sand 1	Beac	h	Mud	l or Timber	A	artificial Shore
	0.0	05 mi		1.61 mi	mi 0 mi (				0.16 mi 0 mi			
Ecological		Brac				and Habitats Exposed (Miles over						
Shoreline Exposures	Salt	marsh	U	pper Inter Mix				ragmites Vetland		nrub/Scrub and prested Wetland		
2.1posu1 es	0.0	62 mi		0 mi		0 1				0 mi		0 mi
		I								ological Thresh		
	Catta	il Marsh	U	pper Inter Mix	tidal	Lower In		idal		ragmites Vetland		nrub/Scrub and rested Wetland
	(	) mi		0 mi		0 1	mi			0 mi		0 mi
	Potential Socioeconomic Impacts from Spill and Response Operations  Response operations may cause major impacts to ports in Albany and throughout river for at least several											
												east several ffic. Evacuation
										miles of shoreli		
Socioeconomic	above th	e level of	f conceri	n for socioe	conom	ic effects; sl	oref	ront m	arinas, l	beaches, parks,	and	real estate
Impacts												focused on areas
		more heavily oiled (about 2 miles). Riverside parks, marinas, beaches, industry, commercial property, and shorefront real estate would be most affected on the west shore from Orangetown to Fort Lee, New Jersey, and										
	on the east shore from Hastings-on-Hudson to Manhattan. Additional impacts may be experienced in other											
	towns along the river. No water intakes would be affected. Additional precautionary fishing advisories would											
	nkely be	likely be instituted for certain parts of the river in the vicinity of the spill.										

#### Yonkers Anchorage 155,000-bbl Gasoline Spill (Winter-Low Tide) Response

		<u> </u>	R	esponse Equipment	t and Plan Activation	n		•		
	NCP and		Tier	Response Requirer	nents	G		Ss Activated ays)		
	USCG Type	Tier 1 (2	4 hrs)	Tier 2 (48 hrs)	Tier 3 (72 hrs)	Rail	Miles	River Miles		
	Major WCD	25,000 ft b 1,000 ft + 3 skimming s 1,875 bbl/c 3,750 bbl s	300 per system day	25,000 ft boom 1,000 ft + 300 per skimming system 3,750 bbl/day 7,500 bbl storage	25,000 ft boom 1,000 ft + 300 per skimming system 7,500 bbl/day 15,000 bbl storage	I	n/a	12 river miles Mile 22-10 2016-98 to 2016-106		
		R	Response	Overview: Expecte	ed Outcomes and C	hallenge				
	Protective E	Booming		nanical Recovery	Shoreline Clear	nup		r Challenges		
Spill Response	Average river of particular structures of the vision of th	currents of ice boom and oom to be ent ice splash in and figurations rotect ice.  by Unified ice	93% e rapid s reduce be recca mecha floatin skimm shoreli boom vacuur skimm Consid Comm perforroperat pruder potent issues.	vaporation and spreading will a amount that can overed nically; mobilize g self-propelled lers; set up ine containment areas with m-trucks and lers.  Ideration by Unified land of not ming skimming ions may be at in light of the ial flammability	Minimal <1% is anticipated to cause shoreline contamin Perform SCAT; we flushing; some sub removal due to penetration on sand beaches; contamina debris removal; BT residue may remain shore sediment.	e nation. etland strate dy ated TEX	Flammal gasoline extremel danger a vapors to public he in the sp public to danger; of firefightion scene wetland challeng wetlands may cau potential of small column water into concerns spilled n evaporat atmosph water co	bility during a spill is an cy significant s are high BTEX or responder and ealth and safety ill areas; notify optential fire		

#### Yonkers Anchorage 155,000-bbl Gasoline Spill with Fire/Explosion

	Location	So	urce	Volume	Oil Type	Seas	son	Tide
Scenario Description	Yonkers Anchorage	collisio	anker n/allision chorage	155,000 bbl	Gasoline	Summ	er	High
C:111		An	nual Pro	bability		Historio	cal Annual (2000-20	Frequency 15)
Spill Probability	Spill of Type	in Hud	son	Spill Volum	e in Hudson	U	S	Hudson
	0.7	32		0.000	00015	0	)	0
	Lat/Lon	Releas	se Rate	Release Date/Time	Run Duration	Wir	nds	Temperature
Conditions	41.91833 -73.96333		0 bbl/hr 4 hrs	1 August 2012 2:00pm	30 days	SW / ligh	t (<4 kts)	81°F
Fire/Explosion	Pool Fire	4		Pool Fire	Vapor (			loud Explosion
<b>Probabilities</b>	Probability/Inc	iaent		cobability 00000012	<b>Explosion</b> / 0.02			obability 0000004
	Emergency	Respon			ion Zone		alth/Safety	
Fire/Explosion Response <sup>37</sup>	spray when fightin inefficient. For small fire: Dry water spray or regular foam. Do not streams. Move con area if possible with Fire involving tankloads: Fight fire fred istance or use untholders or monitor containers with floof water until well. Withdraw immediating sound from devices or discolor. ALWAYS stay a engulfed in fire. For massive fire, hose holders or monitor is impossible, area and let fire bu RP will need to acc Contracted Fire an Resources. Use of foam pumps/monit foam volumes fitte vessel in river to a needed proximity to vessel.	a chemical ar foam er spray, not use statainers fathout risk sor car/om maximanned lanozzles, oding quafter fire liately in venting station of way from use unmonitor no withdray rn. tivate VI d Salvaghigh captors, signed on a fl pproach	al, CO <sub>2</sub> , a. fog or traight from fire k.  (trailer mum nose a Cool nantities is out. a case of safety tank. an tanks  anned zzles; if w from  RP ge pacity inficant oating the	Consider initial evacuation for a meters (1000 feed)  Fire     If tank, rail cases is involved in a for 800 meters (directions; also consider initial 800 meters (1/2) directions	at least 300 et).  r or tank truck fire, ISOLATE (1/2 mile) in all evacuation for	absorbed th Inhalation may irritate Fire will p and/or toxic Vapors ma suffocation. Runoff fro water may c  Protective C Wear posi contained b (SCBA).	rough skin. or contact or burn skin roduce irrit gases. ay cause diz om fire cont cause pollut Clothing tive pressur reathing ap	with material in and eyes. stating, corrosive zziness or trol or dilution tion.  re self-paratus

<sup>&</sup>lt;sup>37</sup> If concurrent with a spill to the water, see also spill response tables. If there is a fire and/or explosion, some or even most of the oil may be consumed by the fire, reducing the amount of oil that would spill into the river and affect shorelines. In most cases, it would be necessary to conduct at least some oil spill cleanup in addition to fire-fighting, though those operations would be secondary to emergency fire-fighting operations.

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	Flammable Distance	Impacts from Fire (Acres)				
Safety Impacts		Total	Residential	Commercial	Industrial	Public Use
	1,473 feet	3.1 acres	0 acres	1.6 acres	1.6 acres	0 acres
	Downwind Distance	Impacts from Explosion (Acres)				
		Total	Residential	Commercial	Industrial	Public Use
	0.033 mile	166 acres	103 acres	27 acres	8 acres	27 acres

### Appendix A: Hudson River Communities by River Mile<sup>38</sup>

Table 1: Hudson River Study Area West Bank Communities in New Jersey		
Town/Village (County)	Approximate River Miles	
Englewood Cliffs (Bergen)	13 – 15	
Alpine (Bergen)	15 – 21	

Table 2: Hudson River Study Area East Bank Communities in New York				
Town/Village (County)	<b>Approximate River Miles</b>			
Riverdale (Bronx)	14 – 17			
Yonkers (Westchester)	17 – 22			
Hastings-on-Hudson (Westchester)	22 – 24			
Dobbs Ferry (Westchester)	24 – 25			
Irvington <sup>39</sup> (Westchester)	25 – 27			
Tarrytown (Westchester)	27 – 30			
Sleepy Hollow <sup>40</sup> (Westchester)	30 – 33			
Scarborough <sup>41</sup> (Westchester)	33 – 34			
Ossining (Westchester)	33 – 35			
Cortlandt <sup>42</sup> (Westchester)	35 – 43, 45 – 52			
Peekskill (Westchester)	43 – 44			
Philipstown <sup>43 (</sup> Putnam)	52 – 63			
Beacon (Dutchess)	63 – 65			
Fishkill (Dutchess)	65			
Wappinger <sup>44</sup> (Dutchess)	65 – 68			
Poughkeepsie <sup>45</sup> (Dutchess)	68 – 75			
Hyde Park <sup>46</sup> (Dutchess)	75 – 87			
Rhinebeck <sup>47</sup> (Dutchess)	87 – 95			
Red Hook <sup>48</sup> (Dutchess)	95 – 103			
Clermont (Columbia)	103 – 105			
Germantown (Columbia)	105 – 109			
Livingston <sup>49</sup> (Columbia)	109 – 112			
Hudson (Columbia)	112 – 119			

<sup>&</sup>lt;sup>38</sup> For more information about the riverside features of each community, refer to HROSRA Volume 2.

For more information about the riverside features of each community, refer to HROSRA Volum Includes: Ardsley-on-Hudson
 Hudson River adjacent part of Town of Mt Pleasant.
 Riverfront part of Briarcliff Manor.
 Includes: Croton-on-Hudson, Crugers, Verplanck, Buchanan, Montrose, and Cortlandt Manor.
 Includes: Garrison and Cold Spring
 Includes: Chelsea.
 Includes: New Hamburg and Wappingers Falls.
 Includes: Staatsburg
 Includes: Rhinecliff
 Includes: Barrytown, Annandale-on-Hudson, and Tivoli.

<sup>48</sup> Includes: Barrytown, Annandale-on-Hudson, and Tivoli.

<sup>&</sup>lt;sup>49</sup> Includes: Linlithgo.

<sup>170</sup> Hudson River Oil Spill Risk Assessment Volume 7: Spill Scenario Summaries

Table 2: Hudson River Study Area East Bank Communities in New York			
Town/Village (County)	Approximate River Miles		
Stockport (Columbia)	119 – 123		
Stuyvesant (Columbia)	123 – 132		
Schodack <sup>50</sup> (Rensselaer)	132 – 141		
Rensselaer (Rensselaer)	141 – 146		

Table 3: Hudson River Study Area West Bank Communities in New York <sup>51</sup>			
Town/Village (County)	Approximate River Miles		
Orangetown <sup>52</sup> (Rockland)	23 – 35		
Haverstraw (Rockland)	35 – 43		
Stony Point <sup>53</sup> (Rockland)	43 – 50		
Highlands <sup>54</sup> (Orange)	50 – 58		
Cornwall (Orange)	58 – 60		
New Windsor (Orange)	60 – 63		
Newburgh (Orange)	63 – 66		
Balmville (Orange)	66 – 67		
Marlboro (Ulster)	67 – 72		
Milton (Ulster)	72 – 73		
Lloyd <sup>55</sup> (Ulster)	73 – 80		
Esopus <sup>56</sup> (Ulster)	80 – 90		
Kingston (Ulster)	90 – 93		
Ulster <sup>57</sup> (Ulster)	93 – 97		
Saugerties <sup>58</sup> (Ulster)	97 – 105		
Catskill <sup>59</sup> (Greene)	105 – 115		
Athens (Greene)	115 – 122		
Coxsackie (Greene)	122 – 128		
New Baltimore (Greene)	128 – 133		
Coeymans <sup>60</sup> (Albany)	133 – 136		
Bethlehem <sup>61</sup> (Albany)	136 – 145		
Albany (Albany)	145 – 153		

 <sup>50</sup> Includes: Castleton-on-Hudson
 51 Based on most recent data available in Wikipedia or other sources.
 52 Includes: Piermont and Grand View-on-Hudson, Nyack, and South Nyack.
 53 Including: Tomkins Cove.
 54 Includes: West Point, Highland Falls, and part of Bear Mountain State Park
 55 Includes: Highland
 56 Includes: West Park and Port Ewen.
 57 Includes: East Kingston and Ulster Landing.
 58 Includes: Glasco and Malden-on-Hudson.
 59 Includes: Hamburg.
 60 Includes: Ravena

<sup>60</sup> Includes: Ravena

<sup>61</sup> Includes: Glenmont