Express Terms

Part 490 Projected Sea-Level Rise

490.1 Purpose

This Part establishes science-based projections of sea-level rise for New York State's tidal coast, including the marine coasts of Nassau, Suffolk and Westchester counties and the five boroughs of New York City, and the main stem of the Hudson River, north from New York City to the federal dam at Troy.

490.2 Applicability

This Part applies to consideration of sea-level rise by the Department, other State agencies, and applicants for relevant permits, approvals, and funding in the context of programs specified in the Community Risk and Resiliency Act.

490.3 Definitions

For the purposes of this Part, the following definitions apply:

(a) '2020s'. The years 2020 through 2029.

(b) '2050s'. The years 2050 through 2059.

(c) '2080s'. The years 2080 through 2089.

(d) 'Baseline level'. The average level of the surface of marine or tidal water over the years 2000 through 2004.

(e) 'ClimAID model outputs'. Projections based on the outputs of global climate models, downscaled to New York, and additional information, including information to account for anticipated changes in the rates of ice melt that cannot yet be more rigorously included in quantitative models.

(f) 'Community Risk and Resiliency Act'. Chapter 355 of the Laws of 2014.

(g) ‘Department’. The New York State Department of Environmental Conservation.

(h) ‘High-medium projection’. The amount of sea-level rise that is unlikely (the 75th percentile of ClimAID model outputs) to be exceeded by the specified time interval.

(i) ‘High projection’. The amount of sea-level rise that is associated with high rates of melt of land-based ice and is very unlikely (the 90th percentile of ClimAID model outputs) to be exceeded by the specified time interval.

(j) ‘Long Island Region’. The marine coast of Nassau and Suffolk counties.

(k) ‘Lower Hudson-New York City Region’. The main stem of the Hudson River, south from the mouth of Rondout Creek at Kingston, New York, and the marine coast of the five boroughs of New York City and the Long Island Sound in Westchester County.

(l) ‘Low-medium projection’. The amount of sea-level rise that is likely (the 25th percentile of ClimAID model outputs) to be exceeded by the specified time interval.

(m) ‘Low projection’. The amount of sea-level rise that is consistent with historical rates of sea-level rise and is very likely (the 10th percentile of ClimAID model outputs) to be exceeded by the specified time interval.

(n) ‘Medium projection’. The amount of sea-level rise that is about as likely as not (the mean of the 25th and 75th percentiles of ClimAID model outputs) to be exceeded by the specified time interval.

(o) ‘Mid-Hudson Region’. The main stem of the Hudson River, from the federal dam at Troy to the mouth of Rondout Creek at Kingston, New York.

(p) ‘Sea-level rise’. The increase in the average level of the surface of marine or tidal water for the specified geographic region.

490.4 Projections

The tables in subdivisions (a), (b), and (c) of this section establish projected sea-level rise for the specified geographic region relative to the baseline level.

(a) Mid-Hudson Region

Time Interval	Low Projection	Low-Medium Projection	Medium Projection	High-Medium Projection	High Projection
2020s	1 inch	3 inches	5 inches	7 inches	9 inches
2050s	5 inches	9 inches	14 inches	19 inches	27 inches
2080s	10 inches	14 inches	25 inches	36 inches	54 inches
2100	11 inches	18 inches	32 inches	46 inches	71 inches

(b) New York City/Lower Hudson Region

Time Interval	Low Projection	Low-Medium Projection	Medium Projection	High-Medium Projection	High Projection
2020s	2 inches	4 inches	6 inches	8 inches	10 inches
2050s	8 inches	11 inches	16 inches	21 inches	30 inches
2080s	13 inches	18 inches	29 inches	39 inches	58 inches
2100	15 inches	22 inches	36 inches	50 inches	75 inches

(c) Long Island Region

Time Interval	Low Projection	Low-Medium Projection	Medium Projection	High-Medium Projection	High Projection
2020s	2 inches	4 inches	6 inches	8 inches	10 inches
2050s	8 inches	11 inches	16 inches	21 inches	30 inches
2080s	13 inches	18 inches	29 inches	39 inches	58 inches
2100	15 inches	21 inches	34 inches	47 inches	72 inches

Regulatory Impact Statement Summary

6 NYCRR Part 490, Projected Sea-level Rise

Introduction

On September 22, 2014, the Governor signed into law the Community Risk and Resiliency Act, Chapter 355 of the Laws of 2014 (CRRA). CRRA is intended to ensure that decisions regarding certain State permits and expenditures consider climate risk, including sea-level rise. Among other things, CRRA requires the Department of Environmental Conservation (Department) to adopt regulations establishing science-based State sea-level rise projections. Therefore, the Department is proposing to establish a new 6 NYCRR Part 490, Projected Sea-level Rise (Part 490). Part 490 will establish projections of sea-level rise in three specified geographic regions over various time intervals, but will not impose any requirements on any entity.

Statutory Authority

The statutory authority to promulgate Part 490 is found in Environmental Conservation Law (ECL) § 3-0319, which was added by CRRA. ECL § 3-0319 requires the Department to adopt regulations establishing science-based State sea-level rise projections by January 1, 2016. The promulgation of Part 490 by the Department will fulfill this statutory requirement.

Legislative Objectives

CRRA was enacted with the purpose of ensuring that decisions regarding certain state permits, regulations, and expenditures include consideration of the effects of climate risk, including sea-level rise, and extreme weather events. Part 490 will implement one component of this objective by providing a common source of sea-level rise projections for consideration within these programs.

Needs and Benefits

CRRA enumerates several permitting, regulatory and funding programs in which the applicants, the Department, or other relevant State agencies shall be required to consider future climate risk, including sea-level rise. Adoption of Part 490 will help to ensure that sea-level rise projections are incorporated into these decision-making processes in a consistent, transparent manner and will contribute to regulatory certainty.

Stakeholder Outreach

The Department conducted outreach to stakeholders in several fora prior to proposing Part 490. This outreach included interaction with the authors of various reports regarding sea-level rise in order to gain understanding of the most current and applicable science. For example, the Department held a teleconference with the authors of two reports on March 6, 2015. Moreover, the Department held individual discussions with certain particularly interested stakeholders, such as the City of New York on June 1, 2015. In addition, the Department's stakeholder outreach included five public informational and listening sessions, at which Department staff presented background on CRRA and the scientific information the Department considered in developing Part 490. These meetings were advertised through Departmental press release and in the Department's Environmental Notice Bulletin, and were held on June 23-25 at locations in Albany, New York City, and Nassau and Suffolk Counties. At these meetings, the Department received input from stakeholders on Part 490.

Summary of Projection Format

Based in part on this input, the Department proposes to adopt five projections for each of three regions of the State. The three regions of the State are Long Island, New York City and the Lower Hudson River upstream to Kingston, and the Mid-Hudson River from Kingston upstream to the federal dam at Troy. These three regions

exhibit small differences in relative sea-level rise due to local conditions. The five projections for these three regions are low, low-medium, medium, high-medium and high. These qualitative terms refer to the rate of rise, not to ultimate water levels, as warming of the Earth system has already resulted in a long-term commitment of at least six feet of global sea-level rise (Strauss, 20131). In other words, while there is some uncertainty regarding the precise rate at which sea level will rise, there is relative certainty that global sea level will ultimately rise at least six feet over current levels. Finally, each of these projections is presented for four different time periods: the 2020s, 2050s, and 2080s, and the year 2100.

Revisions to Part 490

The Department made substantial revisions to Part 490 in response to public comments received on the initial notice of proposed rulemaking. First, the Department substantially revised the definition of "high projection" in subdivision 490.3(i). Pursuant to this revision, in addition to being "very unlikely" to occur, the "high projection" is defined as being "associated with high rates of melt of land-based ice." This revision is intended to acknowledge the fact that, if the high projection is reached by a given time interval, it would be associated with high rates of melt of land-based ice. Second, the Department substantially revised the definition of the term "low projection" in subdivision 490.3(m). Pursuant to this revision, in addition to being "very likely" to be exceeded, the "low projection" is defined as being "consistent with historical rates of sea-level rise." This revision accounts for the fact that future sea-level rise is not projected to be consistent with historical trends, but is instead projected to accelerate with increased warming. In addition, the Department made changes to Sections 490.1 and 490.2 to expand upon the purpose and applicability of Part 490.

ClimAID Report

The Department's proposed sea-level rise projections in Part 490 are based on sea-level rise projections included in Horton et al. (20142), prepared for the New York State Energy Research and Development Authority, also known as the ClimAID report. ClimAID's projections are based on the outputs of more than 20 global climate models, downscaled to New York, using the Intergovernmental Panel on Climate Change's (IPCC) Representative Concentration Pathways (RCP) 4.5 and 8.5 as inputs. RCP 4.5 describes a scenario in which global greenhouse gas emissions increase only slightly before declining around the year 2040, leading to a stabilization of atmospheric greenhouse gas concentrations shortly after the year 2100. RCP 8.5 assumes no significant global emission-reduction policies are implemented and emissions increase, leading to higher atmospheric greenhouse gas concentrations.

Comparison of ClimAID Report to Other Reports

As required by ECL § 3-0319, the Department considered various sources of information in proposing to adopt projections in Part 490 based on the ClimAID report. This includes projections prepared for the National Climate Assessment and the New York State Resiliency Institute for Storms and Emergencies (RISE).

The Department has considered numerous factors in proposing to base Part 490 on the ClimAID projections rather than on more conservative, less protective projections based primarily on process modeling. First, adoption of projections based on the ClimAID report ensures that regulators, planners and others have access to projections developed specifically for New York State and accounting for regional and local factors not considered in development of global sea-level rise projections. Second, the ClimAID research was conducted by the same research team that provided the NPCC projections, using the same methodologies, which have been peer reviewed and published in established scientific journals. Third, ClimAID provides projections for the

entire tidal coast of the state, including the Hudson River upstream to the federal dam in Troy, rather than just Long Island and New York City. Fourth, New York City has already adopted the NPCC/ClimAID projections for its planning purposes; a State regulation based on alternative projections could create confusion among the public, planners and regulated community.

Finally, the proposed projection distribution (low, low-medium, medium, high-medium and high) constitutes a range suitable for risk-based planning and review of projects of varying projected life times and criticality. Although unlikely to occur in the more immediate future, the inclusion of higher sea-level rise projections in Part 490 allows for decision makers to consider the possibility in the context of the programs specified by CRRA.

Perhaps most importantly, the question for decision makers is not if a critical sea level will be reached, but when. Strauss (20133) calculated that historic greenhouse gas emissions have already committed the globe to a mean sea-level rise of 6.2 feet over current levels. Even more conservative projections of rates of sea-level rise indicate sea-level rise of approximately six feet within the next 150 years. Thus, a full range of projections in Part 490 that includes higher values is appropriate to allow for consideration of a level of sea-level rise that will likely occur at some point, even if the timing of such occurrence is uncertain.

Costs

Part 490 will not impose any costs on any entity because the regulation consists only of sea-level rise projections and does not impose any standards or compliance obligations. Therefore, there are no costs associated with Part 490. Likewise, the regulation will also not impose any additional costs on the Department or local government entities.

Local Government Mandates

Part 490 will not create any mandates for local governments, including any additional recordkeeping, reporting, or other requirements.

Paperwork

No additional record keeping, reporting, or other requirements will be imposed under this rulemaking.

Duplication

This proposal does not duplicate, overlap, or conflict with any other federal or State regulations or statutes.

Alternatives

Alternatives to this proposal include: (1) No action, or not establishing Part 490, (2) basing the adopted projections on other scientific reports, and (3) using an alternative projection format.

1) No Action - Not establishing Part 490 is not an available alternative because ECL § 3-0319 requires the Department to adopt a regulation establishing science-based State sea-level rise projections.

2) Other Reports - The Department considered basing its proposed projections on several alternative scientific reports other than the ClimAID report, including Parris et al., (20124), completed for the National Climate Assessment, and Zhang et al., (20145), prepared for RISE. The Department also reviewed and considered information contained in reports of the Intergovernmental Panel on Climate Change (Church et al., 20136), New York State Sea Level Rise Task Force7 and the New York City Panel on Climate Change.8 The Department

rejected basing the projections in Part 490 on any of these other reports because, among other reasons, the ClimAID report covers the entire tidal coast of the State, accounts for local and regional variations in sea-level rise, and incorporates the possibility of rapid ice melt.

3) Other Formats - The Department considered using a different projection format in Part 490, such as different geographic regions or time intervals. The Department is proposing Part 490 in a format that includes five projections for each of three geographic regions based on stakeholder input and because it is consistent with the format of the ClimAID report.

Federal Standards

There are no federal rules or other legal requirements relevant to Part 490. Therefore, this proposal does not result in the imposition of requirements that exceed any minimum standards of the federal government for the same or similar subject areas.

Compliance Schedule

There is no compliance schedule required by the establishment of Part 490 because the rule does not impose any compliance obligations on any entity.

Footnotes

1. Strauss, B. 2013. Rapid accumulation of committed sea-level rise from global warming. Proc. Natl. Acad. Sci. USA. doi: 10.1073/pnas.1312464110

2. Horton, R., D. Bader, C. Rosenzweig, A. DeGaetano, and W.Solecki. 2014. Climate Change in New York State: Updating the 2011 ClimAID Climate Risk Information. New York State Energy Research and Development Authority (NYSERDA), Albany, New York.

3. Strauss. 2013. Op. cit.

4. Parris, A., P. Bromirski, V. Burkett, D. Cayan, M. Culver, J. Hall, R. Horton, K. Knuuti, R. Moss, J. Obeysekera, A. Sallenger, and J. Weiss. 2012. Global Sea Level Rise Scenarios for the US National Climate Assessment. NOAA Tech Memo OAR CPO-1. 37 pp.

5. Zhang, Minghua, Henry Bokuniewicz, Wuyin Lin, Sung-Gheel Jang, and Ping Liu, 2014: Climate Risk Report for Nassau and Suffolk, New York State Resilience Institute for Storms and Emergencies (NYS RISE), NYS RISE Technical Report TR-0-14-01, 49 pp.

6. Church, J.A. 2013. Chap. 13: Sea level change, in climate change 2013: The Physical Science Basis, edited by T.F. Stocker, D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y.xia, V. Bex, and P. Midgley, pp 1137-1216. Cambridge Univ. Press, Cambridge, U.K.

7. New York State Sea Level Rise Task Force: Report to the Legislature. 2010. New York State Department of Environmental Conservation. 103 pp.

8. Horton, R., C. Little, V. Gornitz, D. Bader and M. Oppenheimer. 2015. New York City Panel on Climate Change 2015 Report: Sea level rise and coastal storms. Ann. New York Acad. Sci. 1336:36-44. doi:10.1111/nyas.12593.

Regulatory Impact Statement

6 NYCRR Part 490, Projected Sea-level Rise

Table of Contents

Introduction

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Legislative Objectives

CRRA was enacted with the purpose of ensuring that decisions regarding certain State permits, regulations, and expenditures include consideration of the effects of climate risk, including sea-level rise and extreme weather events. Part 490 will implement one component of this objective by providing a common source of sea-level rise projections for consideration within the programs specified by CRRA. The adoption of Part 490 is the first step in the overall process to implement CRRA, as the Department is also currently preparing guidance, in consultation with the Department of State, regarding the implementation of CRRA. This guidance will address,

among other things, how consideration of the sea-level rise projections in Part 490 should be incorporated into each of the permitting and other programs enumerated in CRRA. CRRA requires this guidance to be adopted by January 1, 2017. Finally, applicants for relevant permits or funding programs will not be required to consider Part 490's sea-level rise projections pursuant to CRRA until such guidance is adopted.

Needs and Benefits

CRRA enumerates several permitting, regulatory and funding programs in which the applicants, the Department, or other relevant State agencies shall be required to consider future climate risk, including sea-level rise. CRRA also amends the State Smart Growth Public Infrastructure Policy Act, ECL Article 6, to add an additional smart growth criterion regarding mitigation of future climate physical risk. Adoption of Part 490 will help to ensure that sea-level rise projections are incorporated into decision-making processes in a consistent, transparent manner and will contribute to regulatory certainty.

Stakeholder Outreach

The Department conducted outreach to stakeholders in several fora prior to proposing Part 490. This outreach included interaction with the authors of various reports regarding sea-level rise in order to gain understanding of the most current and applicable science. For example, the Department held a teleconference with the authors of two reports on March 6, 2015. Moreover, the Department held individual discussions with certain particularly interested stakeholders, such as the City of New York on June 1, 2015. In addition, the Department's stakeholder outreach included five public informational and listening sessions, at which Department staff presented background on CRRA and the scientific information the Department considered in developing Part 490. These meetings were advertised through Departmental press release and in the Department's

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Revisions to Part 490

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exceeded, the "low projection" is defined as being "consistent with historical rates of sea-level rise." This revision accounts for the fact that future sea-level rise is not projected to be consistent with historical trends, but is instead projected to accelerate with increased warming. In addition, the Department made changes to Sections 490.1 and 490.2 to expand upon the purpose and applicability of Part 490.

ClimAID Report

The Department's proposed sea-level rise projections in Part 490 are based on sea-level rise projections included in Horton et al. (20142), prepared for the New York State Energy Research and Development Authority, also known as the ClimAID report. ClimAID provides model-based projections of sea-level rise for three regions of the State for three intervals of time (2020s, 2050s, 2080s) and for the year 2100. Each of the time intervals is centered on the given decade, e.g., 2020s refers to the years 2020 through 2029. The ClimAID report provides these projections for three different tide gauge locations. The sea-level rise projected by the ClimAID report is shown in Table 1 below.

Table 1. ClimAID sea-level rise projections (inches of rise relative to 2000-2004 baseline).

Tide Gauge	Montauk Point				New York City				Troy			
	Percentile											
Time Interval	10th	25th	75th	90th	10th	25th	75th	90th	10th	25th	75th	90th
2020s	2	4	8	10	2	4	8	10	1	3	7	9
2050s	8	11	21	30	8	11	21	30	5	9	19	27
2080s	13	18	39	58	13	18	39	58	10	14	36	54
2100	15	21	47	72	15	22	50	75	11	18	46	71

ClimAID's projections are based on the outputs of more than 20 global climate models, downscaled to New York, using the Intergovernmental Panel on Climate Change's (IPCC) Representative Concentration Pathways (RCP) 4.5 and 8.5 as inputs. RCP 4.5 describes a scenario in which global greenhouse gas emissions increase only slightly before declining around the year 2040, leading to a stabilization of atmospheric greenhouse gas concentrations shortly after the year 2100. RCP 8.5 assumes no significant global greenhouse gas emission-reduction policies are implemented and emissions increase, leading to higher atmospheric greenhouse gas concentrations.

ClimAID's projections also incorporate additional information, e.g., expert judgment, to account for anticipated changes in rates of ice melt that cannot yet be more rigorously included in quantitative models. The methods used by Horton et al. (20143) are identical to those used to generate sea-level rise projections for the New York City Panel on Climate Change (NPCC) and are described in more detail in Horton et al. (20154) and NPCC (20155). The percentiles provided in Table 1 refer to the range of model outputs as reported by ClimAID, e.g., 90th-percentile means that 90 percent of the model outputs were equal to or less than that projection and 10 percent of the model outputs were greater.

The Department is basing its proposed low, low-medium, high-medium and high projections for the three regions of the State on the 10th, 25th, 75th and 90th percentiles of ClimAID model outputs, respectively. The medium projection represents the 50th percentile of ClimAID's model outputs, calculated as the average of the 25th - and 75th-percentile outputs. Stakeholders suggested that the Department add a 50th-percentile projection as many New York City agencies are using the 50th-percentile projection in their operational planning.

Comparison of ClimAID Report to Other Reports

As required by ECL § 3-0319, the Department considered various sources of information in proposing to adopt projections in Part 490 based on the ClimAID report. This includes projections prepared for the National Climate Assessment (NCA) and the New York State Resiliency Institute for Storms and Emergencies (RISE). In reviewing these reports, the Department considered factors such as the degree to which the projections accounted for local and regional variation, whether the projections covered the entire tidal coast of the State, and the way in which the projections accounted for uncertainty regarding the rate of ice melt in the future.

Sea level rose along the U.S. east coast at rates of 0.34 to 0.43 inches per decade prior to the Industrial Revolution (Gehrels, et al., 20056; Donnelly et al., 20047). This relative rise was due primarily to subsidence of the surface as the Earth's crust adjusted to glacial retreat. At the time of the Industrial Revolution, however, regional sea level began to rise more rapidly than it had for the previous millennium as ocean waters began to warm and expand (Holgate and Woodworth, 20048). Extrapolating recent rates of global sea-level rise yields an estimate of approximately eleven inches of rise by 2100. However, scientists project that as the ocean continues to accumulate excess heat due to global warming, sea-level rise due to thermal expansion will continue. Further, as the atmosphere warms, the contribution to sea-level rise by the melting of alpine glaciers and ice sheets, particularly on Greenland and Antarctica, will become the dominant component of global sea-level rise, leading to acceleration of rise into the future.

Parris et al. (20129) generated four global sea-level rise scenarios for use in the NCA through a synthesis of prior assessments. These researchers did not ascribe probabilities or likelihoods to the four scenarios and cautioned that decision makers should not use any of the four scenarios in isolation. Rather, the entire range of possible global sea-level rise should be incorporated into decision making. Although the researchers did not

assign probabilities to any of the four scenarios, they expressed "very high confidence (>9 in 10 chance) that global mean sea level will rise at least 0.2 meters (8 inches) and no more than 2.0 meters (6.6 feet) by 2100."

Local sea-level rise reflects not only global sea-level rise but also regional and local factors, such as local changes in rise and fall of land and regional oceanographic changes. Therefore, it is important to note that the NCA projections are for global sea level-rise, and do not account for regional and local factors along the New York coast. Regional and local factors combine to result in greater sea-level rise along the New York coast than occurs globally. New York State sea-level rise has averaged 1.2 inches per decade since 1900, compared to the observed global rate of rise of 0.7 inches per decade over the same period (Rosenzweig et al., 201110).

Table 2 provides a comparison between projections developed by the NCA and corresponding ClimAID projections for the New York City/Lower Hudson region. The ClimAID projections are relatively consistent with the NCA projections.

Table 2. Comparison of projected sea-level rise under four National Climate Assessment scenarios and corresponding ClimAID projections for New York City/Lower Hudson.

National Climate Assessment (Subtract one inch for direct comparison to ClimAID's 2002 baseline)		ClimAID New York City/Lower Hudson	
Scenario	inches of rise relative to a 1992 baseline	Percentile	inches of rise relative to a 2002 baseline
Highest	79	90th	75
Intermediate-High	46	75th	50
Intermediate-Low	19	25th	22
Lowest	8	10th	15

Although the ClimAID and NCA projections are similar, it is appropriate to base State projections on research that includes regional and local factors, because these factors can have a significant effect on local sea-level rise.

Zhang et al. (201411), otherwise known as the RISE report, modeled sea-level rise for Montauk Point, Suffolk County and the Battery, New York City for the RISE. This report generated projections for portions of the Long Island coast by interpolating model results between Montauk Point and the Battery. RISE reported projections for the 2020s, 2050s and 2080s, but has provided time series data for New York City through 2100 for comparison with ClimAID projections (Table 3). The RISE projections were based on methods similar to those

used by ClimAID, but RISE reports the results of sea-level rise models run under RCP 4.5 and RCP 8.5 separately and does not provide projections for the Hudson River. RISE model outputs are dominated by RCP 4.5 in the lower projection ranges and by RCP 8.5 at higher ranges.

Table 3. Reported projected sea-level rise, New York City (inches of rise relative to 2000-2004 baseline): New York State Resiliency Institute for Storms and Emergencies.

	Percentile		
Time Interval	10^{th} (RCP 4.5)	50^{th} (RCP 8.5)	95^{th} (RCP 8.5)
2020s	3	6	11
2050s	7	16	24
2080s	NA	28	40
2100	14	35	48

RISE and ClimAID low and medium projections are comparable, but RISE projections are significantly lower than the ClimAID projections under high emissions scenarios. For example, RISE's 95th-percentile projection of 48 inches at the Battery by 2100 may be compared to ClimAID's 90th-percentile projection of 75 inches (Table 4).

Table 4. Comparison of High Projected Sea-level Rise Projections, New York City (inches of rise relative to 2000-2004 baseline): ClimAID and New York State Resiliency Institute for Storms and Emergencies.

Time Interval	ClimAID 90th-percentile	RISE 95th-percentile
2020s	10	11
2050s	30	24
2080s	58	40
2100	75	48

The difference between the ClimAID and RISE projections is due primarily to differences between projections of the sea-level rise effect of dynamical changes in land ice, particularly on Greenland and Antarctica, and of surface melt of ice on Greenland. The differences in projections arise from the use of different methods to project these components of sea-level rise (Radley Horton, Minghua Zhang; pers. comm.). RISE bases its projections of these components on IPCC process-based models, which are conservative and do not include the potential for rapid increases in the rate of ice melt. ClimAID assumes these rates will increase with global warming and applies semi-empirical methods that are based on reconstructions of the past relationship between sea level and global temperature. Even semi-empirical methods do not include the sea-level rise effect of a large, singular event, such as collapse of an ice sheet, which could cause even greater increases in sea-level rise.

Given that 6 feet of sea-level rise during the next century cannot be ruled out, and the potential consequences of such rise, the Department is proposing to base Part 490 on the ClimAID projections, including a high projection consistent with ClimAID's 90th-percentile projection. An alternative is to base Part 490 on the RISE projections, which do not include the possibility of high rates of sea-level rise or the potential for low-probability but highly consequential events. Basing Part 490 on the RISE projections would increase the

probability of decisions that do not fully consider the possibility of higher sea-level rise that could occur with rapid ice melt. Moreover, as noted above, six feet of sea-level rise is likely to occur at some point in the future, even if the precise timing of such rise is uncertain.

The Department acknowledges that the highest projections developed by some other studies for New York City are lower than the ClimAID high projections. For example, Kopp et al. (201412) project very likely ranges of sea-level rise for New York City by 2100 of 13 to 48 inches and 17 to 60 inches for RCP 4.5 and RCP 8.5 respectively, compared to the ClimAID 90th-percentile projection of 75 inches. Both Kopp et al. and ClimAID incorporated projections of West Antarctic ice melt generated by Bamber and Aspinall (201313), but in different ways. Bamber and Aspinall had attempted to address suggestions that sea-level rise attributable to ice sheet melt was underestimated by pooling expert views on uncertainties in future ice-melt contributions. Kopp et al. reconciled the projections of West Antarctic ice sheet melt generated by Bamber and Aspinall to the IPCC Fifth Assessment Report (AR5) projections, which do not include potential rapid ice sheet deterioration, by applying multipliers to the Bamber and Aspinall range. This approach eliminated low, but non-zero, probability ranges from Kopp et al.'s projections and eliminated consideration of accelerating melt rates. On the other hand, Horton et al. (201414) surveyed 90 experts, which yielded higher projections of global sea-level rise at higher emissions levels (RCP 8.5) than had been projected by Kopp et al. or AR5. Kopp et al. suggest this result may be related to expert expectations about future Antarctic ice melt. It is worth noting that 75 inches of sea-level rise, ClimAID's high New York City projection for 2100, falls within Kopp et al.'s likely range for New York City by 2150, under RCP 8.5, of 43 to 79 inches.

While there are differences among the highest projections for sea-level rise, based largely on the manner in which projections account for the potential for rapid ice melt, the question of the future contribution of ice melt,

particularly from Greenland and Antarctica, is one of the most important facing scientists studying sea-level rise. Bamber and Aspinall (201315) surveyed the same sea-level rise experts in 2010 and 2013 regarding future ice-sheet contributions. At least three of the 13 respondents significantly increased the upper bounds of their projections from the first survey to the second and the authors concluded the results indicate "a growing view that a significant marine ice-sheet instability in the WAIS [West Antarctic Ice Sheet] could initiate in the coming century." Although the Department recognizes uncertainty regarding the rate of future ice melt, it is appropriate to allow for consideration of the potential for more rapid ice melt, as explained in more detail below.

Reasons for Basing Projections on ClimAID Report

The Department has considered numerous factors in proposing to base Part 490 on the ClimAID projections rather than on more conservative, less protective projections based primarily on process modeling.

First, adoption of projections based on the ClimAID report ensures that regulators, planners and others have access to projections developed specifically for New York State and accounting for regional and local factors not considered in development of global sea-level rise projections.

Second, the ClimAID research was conducted by the same research team that provided the NPCC projections, using the same methodologies, which have been peer reviewed and published in established scientific journals. New York City has already adopted the NPCC/ClimAID projections for its planning purposes; a State regulation based on alternative projections could create confusion among the public, planners and regulated community.

Third, ClimAID provides projections for the entire tidal coast of the state including the Hudson River upstream to the federal dam in Troy, rather than just Long Island and New York City.

Fourth, the proposed projection distribution (low, low-medium, medium, high-medium and high) constitutes a range suitable for risk-based planning and review of projects of varying projected life times and criticality. By having a full range of projections that include a high-medium and high value, decision makers will be able to consider the possibility of more rapid sea-level rise as it relates to particular projects in the context of relevant programs under CRRA.

Fifth, this projection distribution has been useful to communities conducting adaptation planning along the Hudson River.

Inclusion of Higher Projections of Sea-Level Rise

The Department acknowledges that ClimAID's 75th- and 90th-percentile projections include estimates of the contribution of land ice melt, and that these estimates incorporate some amount of uncertainty. Some of this uncertainty is due to the nature of making any projections about the future, including regarding the rate of sea-level rise, rather than basing figures solely on historical data. In Part 490, these 75th- and 90th-percentile projections correspond to high-medium and high projections. As defined in Part 490, these two projections are unlikely and very unlikely to be exceeded by the specified time interval, respectively, meaning that decision makers will be able to consider these projections as appropriate for the particular project.

Similarly, it is possible that the inclusion of higher projections of sea-level rise could lead to consideration of conditions that are unlikely to occur, at least in the more immediate future. However, decision makers should at

least consider the potential consequences of future events about which scientific uncertainty remains. Adoption of several levels of projections allows for consideration of risk tolerance in decision making. The high-medium or high projections might be used for long-term projects for which there is low risk tolerance, for example, while lower projections may be appropriate for consideration in situations in which risk tolerance is high. Inclusion of unlikely but plausible projections provides benchmarks against which long-term decisions, e.g., those regarding critical infrastructure and land-use change, can be evaluated for low-probability but high-consequence events. If Part 490 did not include higher projections of sea-level rise, then decision makers would not be able to even consider the possibility of such levels occurring.

Furthermore, Hinkel et al. (201516) warn that sea-level rise projections based on process-based models, such as those used by IPCC and RISE, are primarily intended for the purpose of understanding earth system physics and are not appropriate for risk-based decision making as they do not fully incorporate the effects of accelerated ice melt. They warn that projections based on the IPCC AR5 projections of mean global sea-level rise of 11 to 39 inches by 2100 may not be adequate for risk management due to the intolerably high residual risk associated with rapid ice melt. Parris et al. (201217) also cautioned that focusing only on the most probable outcome could lead to vulnerability or maladaptation. Decision makers, including residents and local leaders, should understand the full range of potential risk. Communities and stakeholders in New York State that have been presented with the ClimAID projections have tended to adopt and plan for high levels of sea-level rise rather than more moderate levels. These stakeholders have placed a high degree of importance on ensuring the viability of proposed infrastructure investments and the social and economic fabric of their communities from even unlikely eventualities.

The Department acknowledges that RCP 8.5, under which the highest sea-level rise projections were generated, may be averted by global action to reduce greenhouse gas emissions. However, this factor must be weighed against research published since the ClimAID projections were released that indicate even greater rates of sea-level rise are occurring. For example, Carling et al. (201518) determined that the rate of global sea-level rise during the past two decades had been significantly higher than previously believed and concluded that revising the rate of rise to reflect more recent rise would affect some sea-level rise projections upward. In any case, as explained above, the higher sea-level rise projections are defined in Part 490 as being unlikely or very unlikely to be exceeded by the specified time interval, and may be considered as appropriate for the particular project at issue.

Finally, as explained above, sea-level rise will continue for many centuries as the earth system comes into equilibrium over many centuries or even millennia. Thus, as noted above, the question for decision makers is not if a critical sea level will be reached, but when. Strauss (201319) calculated that historic emissions have already committed the globe to a mean sea-level rise of 6.2 feet. Levermann et al. (201320) estimated that the current international target of 2°C warming will result in an eventual mean global sea-level rise of more than 15 feet after 2000 years. Even some more conservative projections of rates of sea-level rise, e.g., the RISE 50th-percentile RCP 8.5 projection, indicate sea-level rise of approximately six feet within the next 150 years. Thus, a full range of projections in Part 490 that includes higher values is appropriate to allow for consideration of a level of sea-level rise that will likely occur at some point, even if the timing of such occurrence is uncertain.

Costs

Part 490 will not impose any costs on any entity because the regulation consists only of sea-level rise projections and does not impose any standards or compliance obligations. In other words, while Part 490 will

provide a common source of sea-level rise projections for consideration within programs specified by CRRA, it will not impose any requirements on any entity. Therefore, there are no costs associated with Part 490. Likewise, the regulation will also not impose any additional costs on the Department or local government entities.

Local Government Mandates

Part 490 will not create any mandates for local governments, including any additional recordkeeping, reporting, or other requirements.

Paperwork

No additional record keeping, reporting, or other requirements will be imposed under this rulemaking.

Duplication

This proposal does not duplicate, overlap, or conflict with any other existing federal or State regulations or statutes.

Alternatives

Alternatives to this proposal include: (1) No action, or not establishing Part 490, (2) basing the projections in Part 490 on scientific reports other than the ClimAID report, and (3) using an alternative projection format.

1) No Action - Not establishing Part 490 is not an available alternative because ECL § 3-0319 requires the Department to adopt a regulation establishing science-based State sea-level rise projections.

2) Other Reports - The Department considered basing its proposed projections on several alternative scientific reports other than the ClimAID report, including Parris et al., (201221), completed for the NCA, and Zhang et al., prepared for RISE (201422). The Department also reviewed and considered information contained in reports of the IPCC (Church et al., 201323), New York State Sea Level Rise Task Force24 and the NPCC.25 The Department rejected basing the projections in Part 490 on any of these other reports because, among other reasons and as explained above in the Needs and Benefits section, the ClimAID report covers the entire tidal coast of the State, accounts for local and regional variations in sea-level rise, and incorporates the possibility of rapid ice melt.

3) Other Formats - The Department considered using a different projection format in Part 490. For example, the Department considered including projections for different geographic regions or time intervals, or including a different range of projections. The Department is proposing Part 490 in a format that includes five projections for each of three geographic regions based on stakeholder input and because it is consistent with the format of the ClimAID report.

Federal Standards

There are no federal rules or other legal requirements relevant to Part 490. Therefore, this proposal does not result in the imposition of requirements that exceed any minimum standards of the federal government for the same or similar subject areas.

Compliance Schedule

There is no compliance schedule required by the establishment of Part 490 because the rule does not impose any compliance obligations on any entity.

Footnotes

1. Strauss, B. 2013. Rapid accumulation of committed sea-level rise from global warming. Proc. Natl. Acad. Sci. USA. doi: 10.1073/pnas.1312464110

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4. Horton, R., C. Little, V. Gornitz, D. Bader and M. Oppenheimer. 2015. New York City Panel on Climate Change 2015 Report: Sea level rise and coastal storms. Ann. New York Acad. Sci. 1336:36-44. doi:10.1111/nyas.12593

5. NPCC 2015: Appendix IIB. Sea level observations and projections: Methods and Analyses. Ann. N.Y. Acad. Sci. 1336(1):116-150. doi:10.1111/nyas.12593

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7. Horton, R., C. Little, V. Gornitz, D. Bader and M. Oppenheimer. 2015. New York City Panel on Climate Change 2015 Report: Sea level rise and coastal storms. Ann. New York Acad. Sci. 1336:36-44. doi:10.1111/nyas.12593

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19. Strauss. 2013. Op. cit.

20. Levermann, A., P. Clark, B. Barzeion, G. Milne, D. Pollard, V. Radic, and A. Robinson. 2013. The multimillennial sea-level commitment of global warming. Proc. Natl. Acad. Sci. USA. 10.1073/pnas1219414110

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22. Zhang, Minghua, Henry Bokuniewicz, Wuyin Lin, Sung-Gheel Jang, and Ping Liu, 2014: Climate Risk Report for Nassau and Suffolk, New York State Resilience Institute for Storms and Emergencies (NYS RISE), NYS RISE Technical Report TR-0-14-01, 49 pp.

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24. New York State Sea Level Rise Task Force: Report to the Legislature. 2010. New York State Department of Environmental Conservation. 103 pp.

25. Horton et al. 2015. Op. cit.

Assessment of Public Comments

6 NYCRR Part 490, Projected Sea-Level Rise

Table of Contents

Comments Received from November 30, 2016 through December 30, 2016

General Support

Comment 1: Ten of the fourteen parties expressed general support for adoption of sea-level rise projections. (Dunn, Freudenberg, Gallay, Gruskin, Noble, Ross, Tabak, Wentz and Zarrilli).

Response to Comment 1: Thank you for your comments.

Statewide Consistency

Comment 2: Adoption of projections consistent with New York City Panel on Climate Change projections will allow for coordinated decision making and avoid unnecessary confusion of competing projections. (Dunn, Zarilli)

Response to Comment 2: While this comment does not address the revisions to the proposed regulation, the Department agrees. See Response to Comment 2, Assessment of Public Comments Received from November 10, 2015 through December 28, 2015 ("Initial APC").

Additional Requirements and Regulations Needed

Comment 3: We are astonished that this proposal comes with no government mandates; we ask that this proposal be actively used to cut costs to NY State taxpayers who are currently investing heavily in developments in areas at high risk of sea-level inundation. (Donnelly)

Response to Comment 3: This comment does not address the revisions to the proposed regulation, but see Response to Comment 3, Initial APC.

Comment 4: DEC should apply information in Part 490 to administration of the state Brownfield Cleanup Programs to prevent any further taxpayer investment in housing developments in coastal areas that will be inundated by high water table and eventually higher water levels. (Donnelly)

Response to Comment 4: This comment does not address the revisions to the proposed regulation, but see Response to Comment 3, Initial APC.

Basis of Projections

Comment 5: These projections represent the best currently available science. (Dunn, Freudenberg, Gruskin, Noble, Tabak, Wentz and Zarrilli)

Response to Comment 5: While this comment does not address the revisions to the proposed regulation, the Department agrees. See also Response to Comment 8, Initial APC.

Comment 6: DEC should extend projections through 2200. (Gallay)

Response to Comment 6: This comment does not address the revisions to the proposed regulation. Regardless, the Department acknowledges the need to consider sea-level rise beyond 2100 in the design of long-lived infrastructure and land-use changes. As explained in the RIS and in Response to Comments 7, 8, and 15 in the Initial APC, the Department's projections in Part 490 are based on the ClimAID Report. The ClimAID Report,

however, does not include projections through 2200. Moreover, New York State-specific, peer-reviewed projections through 2200 are not otherwise available. Therefore, at this time, the Department has not identified any appropriate science-based projections upon which to base State projections beyond 2100 in Part 490.

Furthermore, Environmental Conservation Law (ECL) § 3-0319 requires the Department to update its sea-level rise projection regulations at least every five years. Such future updates may include consideration of extended projections beyond 2100 and through 2200.

Finally, the Department, in consultation with the Department of State, is developing implementation guidance that will describe how to consider sea-level rise in the programs specified by CRRA and will consider including guidance on use of long-range projections not included in Part 490.

Comment 7: DEC should include a storm-surge "reminder" with the sea level projections. (Gallay)
Response to Comment 7: This comment does not address the revisions to the proposed regulation, and CRRA does not include a provision for the Department to include a storm-surge "reminder" in the sea-level rise projections in Part 490. However, as required by CRRA, the Department, in consultation with the Department of State, is developing implementation guidance that will describe how to consider sea-level rise, storm surge and flooding in the programs specified by CRRA.

Comment 8: You should be concerned with the coming cold period and what it means for New York residents, not making plans for any global warming. (Lisenbee)
Response to Comment 8: This comment does not address the revisions to the proposed regulation. Moreover, no scientific information exists to suggest an imminent global cooling period.

Alternative Approach Suggested

Comment 9: The Department should adopt a "pledge and review" approach to establish sea-level rise policy. Sea-level rise planning values would be based on observed rates of rise at specified tide gauges during 5-year periods and would be adjusted according to the observed rates of sea-level change during the most recent 5-year period at the selected gauges. (Caiazza)

Response to Comment 9: This comment does not address the revisions to the proposed regulation, but see Response to Comment 9, Initial APC.

Rulemaking Procedure

Comment 10: The regulated community cannot meaningfully comment on the sea-level rise projection numbers in the absence of the remainder of the regulatory scheme. (Caiazza, Hamling)

Response to Comment 10: This comment does not address the revisions to the proposed regulation, but see Response to Comments 3, 10, 11, and 12, Initial APC.

Comment 11: This is an improper and illegal rulemaking as the proposed regulation has no context and cannot be understood by the regulated community. (Hamling)

Response to Comment 11: See response to Comments 3, 10, 11, and 12, Initial APC.

Comment 12: Precluding meaningful input while simultaneously putting into place a binding requirement affecting future regulatory enactments is illegal and is an improper attempt to insulate the regulation from challenge. (Hamling)

Response to Comment 12: This comment does not address the revisions to the proposed regulation, but see Response to Comments 3, 10, 11, and 12, Initial APC.

Comment 13: Although the Department's webpage states that all of the regulatory documents are available on the Department's website, the required regulatory flexibility analysis and the rural area flexibility analysis are not included. (Hamling)

Response to Comment 13: See Response to Comment 13, Initial APC. Moreover, while a Rural Area Flexibility Analysis (RAFA) and a Regulatory Flexibility Analysis for Small Businesses and Local Governments (RFASBLG) are not required for Part 490, statements in lieu of a RAFA and RFASBLG are available on the Department's website.

Comment 14: Enactment of Part 490 as a stand-alone regulation results in improper segmentation. Proposed Part 490 enacts numerical standards that will, pursuant to the express terms of the CRRA, be utilized as part of permitting requirements for thirteen (13) separate regulatory programs administered by the Department. Promulgating these numerical standards without considering the entirety of the CRRA regulatory program, as a matter of law, fails to consider the entire "action" as required by SEQRA. (Hamling)

Response to Comment 14: See response to Comment 14, Initial APC.

Comment 15: Notice of Revised Rulemaking provides different contact information
for submission of comments on or inquiries related to the proposed Part 490 than the notice placed in the Environmental Notice Bulletin on November 30, 2016.

Response to Comment 15: The Department responded to inquiries and accepted comments addressed to either of the two e-mail addresses provided.

Comment 16: This rulemaking is improper because, although it is labeled a "revised rulemaking," it contains no "substantial revisions" as is required to issue a revised rulemaking. (Hamling)

Response to Comment 16: As described in the Regulatory Impact Statement (RIS) and in Response to Comments 6, 7, 9, and 15 of the Initial APC, the Department made substantial revisions to Part 490 in response to public comments received on the initial notice of proposed rulemaking.

First, the Department substantially revised the definition of "high projection" in subdivision 490.3(i). Pursuant to this revision, in addition to being "very unlikely" to occur, the "high projection" is defined as being "associated with high rates of melt of land-based ice." This revision is intended to acknowledge the fact that, if the high projection is reached by a given time interval, it would be associated with high rates of melt of land-based ice. Second, the Department substantially revised the definition of the term "low projection" in subdivision 490.3(m). Pursuant to this revision, in addition to being "very likely" to be exceeded, the "low projection" is defined as being "consistent with historical rates of sea-level rise." This revision accounts for the fact that future sea-level rise is not projected to be consistent with historical trends, but is instead projected to accelerate with increased warming.

As described in the RIS and in Response to Comments 3, 10, 11, 12, 13, and 14 of the Initial APC, Part 490 will serve as common source of sea-level rise projections for consideration within the programs specified by CRRA. The primary scope and purpose of this regulation is to establish science-based projections of sea-level rise, rather than to establish numerical standards or impose any requirements on any entity. Especially given this unique scope and purpose of Part 490, the two changes described above amount to substantial revisions because they materially alter the regulation's meaning and effect. These changes directly affect the meaning and sole

substance and topic of the regulation: the science-based projections of sea-level rise. By adding new language that changes and expands upon the scientific basis and significance of particular projection levels in the regulation, these changes to Part 490 materially alter both the meaning and effect of the overall regulation.

In addition, the Department made changes to Sections 490.1 and 490.2 to expand upon the purpose and applicability of Part 490. The change to the applicability provision in Section 490.2 included the addition of "funding" to the types of programs covered by the regulation. This change also amounts to a substantial revision, because a change that expands the applicability of the regulation materially alters the regulation's effect.

Finally, the Department determined that, because of the public interest in and comments on the initial proposed rule, as well as the changes made to Part 490, the rule would benefit from additional opportunity for public review, as required by the State Administrative Procedure Act.

Definitions

Comment 17: We agree with the changes to the definitions of the high and low projections. (Caiazza)

Response to Comment 17: Thank you for your comment.

Comment 18: Definitions should more clearly articulate the likelihood of that rate of sea-level rise occurring. (Gruskin)

Response to Comment 18: See response to Comment 15, Initial APC.

Comment 19: DEC should clarify the potential to exceed the high projection. DEC should emphasize the lower probability, higher consequence outcomes and de-emphasize low and medium projections. (Gallay, Wentz)

Response to Comment 19: The Department's intent with regard to Part 490 is to provide projections of sea-level rise that represent the best available scientific research, specific to New York State, in a policy-neutral manner. The Department, in consultation with the Department of State, is developing implementation guidance that will describe how to consider sea-level rise, in the programs specified by CRRA, including recommendations on the specific sea-level rise projections in Part 490 to be considered. As explained in Response to Comment 15, Initial APC, probabilities of specified amounts of sea-level rise cannot be assigned based on available peer-reviewed, New York State-specific information. Further, there is not general scientific agreement that ten feet of sea-level rise by 2100, as suggested by one commenter, is physically possible.

Adopt Part 490 Quickly

Comment 20: DEC is currently in violation of a clear statutory directive to adopt sea-level rise projections by January 1, 2016 to complete a mandatory duty. Further, the CRRA applies automatically to all permit applications received by DEC after January 1, 2017. Thus, the agency's failure to adopt projections and guidance frustrates efforts by permit applicants to remain in compliance with the law. (Freudenberg, Gallay, Gruskin, Wentz)

Response to Comment 20: The Department acknowledges it did not adopt this regulation by January 1, 2016, but believes allowing sufficient time for assessment of all available scientific information and opportunity for robust public input has been critical to development of this regulation. Moreover, during this time, the Department, in consultation with the Department of State, has been developing guidance regarding the implementation of CRRA, including guidance that will describe how to consider sea-level rise, storm surge and flooding in the programs specified by CRRA. The adoption of Part 490, together with the CRRA

implementation guidance, will facilitate permit applicants' and state agencies' consideration of sea-level rise, storm surges, and flooding in the programs specified by CRRA, in compliance with the law.

Waste of Funds

Comment 21: I do not support this proposal. It is a waste of NY State funds. (Hutchison)

Response to Comment 21: This comment does not address the revisions to the proposed regulation. In any case, the proposed regulation does not directly require the expenditure of any New York State funds. Moreover, pursuant to ECL § 3-0319, which was added by CRRA, the Legislature directed the Department to adopt a regulation establishing science-based State sea-level rise projections.

List of Commenters

Organization	Name	
1	City of New York	Daniel Zarrilli
2	Environmental Energy Alliance of New York	Roger Caiazza
3	Friends & Residents of Greater Gowanus	Marlene Donnelly
4	N/A	Jay Ross
5	Kingston Conservation Advisory Council	Julie Noble
6	N/A	Len Lisenbee
7	New York Construction Materials Association	David Hamling
8	Regional Plan Association	Robert Freudenberg
9	Hudson Riverkeeper et al.*	Paul Gallay
10	N/A	Robert Hutchison
11	Sabin Center for Climate Change Law	Jessica Wentz

12	Scenic Hudson	Nava Tabak
13	Seatuck Environmental Association	Maureen Dunn
14	The Nature Conservancy	Stuart Gruskin

*Submitted on behalf of Citizens Campaign for the Environment; Hudson Riverkeeper; Natural Resources Defense Council; New York/New Jersey Baykeeper; Peconic Baykeeper; Super Law Group, LLC

Summary of Comments Received from November 10, 2015 through December 28, 2015

The Community Risk and Resiliency Act, Chapter 355 of the Laws of 2014 (CRRA), is intended to ensure that decisions regarding certain State permits and expenditures consider climate risk, including sea-level rise. CRRA created a new Environmental Conservation Law (ECL) § 3-0319 that requires the Department of Environmental Conservation (Department) to adopt regulations establishing science-based State sea-level rise projections. To fulfill this statutory requirement, the Department is establishing a new 6 NYCRR Part 490, Projected Sea-level Rise (Part 490). Part 490 establishes projections of sea-level rise in three specified geographic regions over various time intervals, but does not impose any requirements on any entity.

The Department's sea-level rise projections in Part 490 are based on sea-level rise projections included in Horton et al. (2014), prepared for the New York State Energy Research and Development Authority, also known as the ClimAID report. Pursuant to CRRA, the Department, in consultation with the Department of State, is also developing implementation guidance that will describe how to consider flooding, storm surge, and the sea-level rise projections in Part 490 in the programs specified by CRRA.

The Department formally proposed Part 490 on November 10, 2015 and accepted public comments through December 28, 2015. The Department received public comments from nine individuals during the public

comment period. The Department has reviewed, summarized, and responded to all relevant public comments received during the public comment period. In response to comments, the Department substantially revised the express terms of Part 490, including the definitions of the terms "low projection" and "high projection." The Department received two public comments outside of the public comment period, which the Department has also addressed despite their being outside the scope of the rulemaking.

The vast majority of commenters supported the approach the Department has taken in developing Part 490. In particular, many commenters expressed support for basing State projections on the ClimAID report, including a high projection of approximately 6 feet of sea-level rise by 2100. Moreover, the City of New York described the benefits of statewide consistency, including that adoption of projections consistent with New York City Panel on Climate Change projections will allow for coordinated decision making and avoid unnecessary confusion of competing projections. The projections in Part 490 are based on the ClimAID report, including a high projection of approximately 6 feet of sea-level rise by 2100, and are consistent with New York City Panel on Climate Change projections.

Some commenters noted that no further requirements will be imposed by Part 490, and stated that they cannot understand why the adoption of scientific sea-level rise projections imposes no requirements on anyone. As explained in the Regulatory Impact Statement (RIS), the Department is promulgating Part 490 pursuant to ECL § 3-0319. This provision does not authorize the Department to impose additional requirements through this Part 490 regulation. In addition, pursuant to CRRA, the Department, in consultation with the Department of State, is also developing implementation guidance that will describe how to consider sea-level rise in the programs specified by CRRA. While Part 490 itself does not impose any requirements, it provides a common source of sea-level rise projections for consideration within the programs specified by CRRA.

One commenter suggested that six foot of sea level rise is so unlikely that it does not reach the threshold of "plausible." This commenter stressed the uncertainty regarding the rate of future ice melt, including the lack of consensus for ice sheet collapse, and the uncertainty related to the timing of sea-level rise in the event of rapid ice melt. The Department acknowledges the lack of expert consensus regarding the likely rate of ice sheet melt and potential for ice sheet collapse. In response to this and other comments, the Department substantially revised the definition of the term "high projection" to include that it is "associated with high rates of melt of land-based ice."

In any case, Part 490 includes a range of projections of sea-level rise. The projection distribution constitutes a range suitable for risk-based planning and review of projects of varying projected life times and criticality. Part 490 explicitly defines the "high projection" in the regulation as being "very unlikely" to occur. The Department maintains that it is prudent to include a high, albeit unlikely, projection to enable consideration of the consequences of low-probability but high-consequence events. The manner in which the high projection should be considered in the context of particular projects will be addressed through the CRRA implementation guidance currently being developed by the Department in consultation with the Department of State.

One commenter stated that, in order for the six foot of sea-level rise projection to be considered credible, the RIS must explain why certain conclusions of the Intergovernmental Panel on Climate Change (IPCC) were "ignored." The Department carefully reviewed these IPCC projections, which are based on process models that assume static or linear rates of ice sheet loss over Greenland and Antarctica. As explained in the RIS, for numerous reasons, the Department based the projections in Part 490 on the ClimAID projections, rather than on other more conservative, less protective projections based primarily on process modeling. As stated in the RIS,

the Department acknowledges that the highest projections developed by some other studies are lower than the ClimAID high projections. The ClimAID projections incorporate expert judgment of ice loss based on accelerating rates of melt and seaward movement of ice, positive feedbacks and non-linearities that are not necessarily accounted for in the process-based and statistical modeling approaches described by the IPCC. In any case, Part 490 explicitly defines the high projection as "very unlikely."

One commenter suggested that the Department should adopt a "pledge and review" approach to sea-level rise values, under which projections would be based on observed rates of rise at specified tide gauges during 5-year review periods. First, ECL § 3-0319, as added by CRRA, requires the Department to consider certain specified information and reports in promulgating science-based State sea-level rise projections. Second, ECL § 3-0319 requires the Department to update its sea-level rise projection regulations at least every five years, which the Department will do through future action.

Moreover, while the Department has not yet determined the precise review process it will use, it has concerns with the pledge and review approach suggested. The first is its reliance on a limited number of tide gauges, given that local factors can affect sea-level change at individual stations so that significantly different trends are indicated, even from proximate stations. Secondly, the pledge and review approach would yield planning values based only on historical trends in rise or rates of rise, whereas CRRA requires consideration of future climate risk. As described in the RIS, the rate of sea-level rise is not projected to be constant based on historical values but is instead projected to accelerate with increased warming. In response to this and other comments, the Department substantially revised the definition of the term "low projection" to include that it is "consistent with historical rates of sea-level rise." Projections based solely on the pledge and review approach could be easily

skewed by short-term, localized phenomena, and the approach would fail to account for acceleration of sea-level rise that would occur with projected warming.

One commenter raised several issues regarding the rulemaking procedure used to adopt Part 490. First, for example, this commenter claimed that this is an improper and illegal rulemaking as the proposed regulation has no context and cannot be understood by the regulated community. The Department disagrees, as this clam is incorrect. The promulgation of Part 490 complies with the State Administrative Procedure Act (SAPA) and all other rulemaking requirements. The Legislature established the context of Part 490 through the statutory language of CRRA. Moreover, the context of the regulation is further described in the RIS.

Furthermore, , even before the formal proposal of Part 490 pursuant to SAPA, the Department held an extensive public stakeholder outreach process. As summarized in the RIS, this process included five public informational and listening sessions, at which Department staff presented background on CRRA, including the overall context of the regulation.

In addition, as explained in the RIS, Part 490 does not impose any requirements on any entity. Part 490 implements one component of CRRA by providing a common source of sea-level rise projections for consideration within the programs specified by CRRA. The adoption of Part 490 is the first step in the overall process to implement CRRA, as the Department is also currently preparing guidance, in consultation with the Department of State, regarding the implementation of CRRA. This guidance will address, among other things, how consideration of the sea-level rise projections in Part 490 should be incorporated into each of the permitting and other programs enumerated in CRRA. CRRA requires this guidance to be adopted by January 1,

2017. Applicants for relevant permits or funding programs will not be required to consider Part 490's sea-level rise projections pursuant to CRRA until such guidance is adopted.

Second, this commenter also argued that precluding meaningful input while simultaneously putting into place a binding requirement affecting future regulatory enactments is illegal and is an improper attempt to insulate the regulation from challenge. Through the promulgation of Part 490, the Department neither precluded meaningful input nor put into place a binding requirement affecting future regulatory enactments. Rather than precluding meaningful input, as explained in the RIS, the Department provided several opportunities for input on Part 490, including through stakeholder outreach before the formal proposal of the regulation for public comment. Moreover, the Department will also provide additional opportunities for meaningful input on future CRRA implementation actions. Furthermore, the Department reiterated that Part 490 does not impose a binding requirement affecting future regulatory enactments. Finally, to the extent the Department undertakes any future regulatory enactments that incorporate Part 490, such future action will be subject to SAPA and other procedural rulemaking requirements, including an opportunity for public comment.

Third, the commenter also argued that the regulated community cannot meaningfully comment on the sea-level rise projection numbers in the absence of the remainder of the regulatory scheme. The RIS describes the manner in which Part 490 fits into the overall scheme of CRRA. The Legislature established the context of Part 490 through the statutory language of CRRA.

A primary reason for adopting Part 490 first, prior to the finalization of CRRA implementation guidance, is the statutory language of CRRA itself. Part 490 is the first step in the overall process to implement CRRA. The Department, in consultation with the Department of State, is currently developing CRRA implementation

guidance, and applicants for relevant permits or funding programs will not be required to consider Part 490's sea-level rise projections pursuant to CRRA until such guidance is adopted.

The Department recognizes that the regulated community is interested in both the sea-level rise projections numbers in Part 490, as well as the manner in which consideration of these projections will be incorporated into the programs specified by CRRA. The Department will provide additional opportunities for meaningful input on future CRRA implementation actions. Furthermore, to the extent the Department undertakes any future regulatory enactments that incorporate Part 490, such future action will be subject to SAPA and other procedural rulemaking requirements, including an opportunity for public comment.

Finally, two commenters suggested that definitions should more clearly articulate the likelihood of particular rates of sea-level rise occurring. As described in the RIS, the projections included in Part 490 are not associated with specific probabilities. There is no way to describe an accurate probability distribution for various levels of future sea-level rise from the ClimAID projections. Rather, the Department's terminology and definitions provide a qualitative indication of the relative likelihood of the specified rise. The Department substantially revised the definitions of the terms "low projection" and "high projection" in response to these and other comments.

Comments Received from November 10, 2015 through December 28, 2015

General Support

Comment 1: Many commenters voiced general support for the approach the Department has taken in developing Part 490. (Hayward, Gladstein, Subbarama, Zarrilli, Crotty, Scatta, Gruskin, Warren).

Response to Comment 1: Thank you for your comments.

Statewide Consistency

Comment 2: Adoption of projections consistent with New York City Panel on Climate Change projections will allow for coordinated decision making and avoid unnecessary confusion of competing projections. (Zarrilli)

Response to Comment 2: The Department agrees. As described in the Regulatory Impact Statement (RIS), the projections in 6 NYCRR Part 490, Projected Sea-Level Rise (Part 490), are consistent with the New York City Panel on Climate Change Projections, and therefore will provide the benefits described by the commenter.

Additional Requirements and Regulations Needed

Comment 3: No further requirements will be imposed by this regulation and applicants need only consider climate change. We cannot understand why the adoption of scientific sea-level rise projections imposes no requirements on anyone. (Gladstein, Subbarama, Warren)

Response to Comment 3: As explained in the RIS, the Department is promulgating Part 490 pursuant to Environmental Conservation Law (ECL) § 3-0319. This provision was added by the Community Risk and Resiliency Act, Chapter 355 of the Laws of 2014 (CRRA). CRRA does not authorize the Department to impose additional requirements through this Part 490 regulation. Pursuant to CRRA, the Department, in consultation with the Department of State, is developing implementation guidance that will describe how to consider sea-level rise in the programs specified by CRRA. While Part 490 itself does not impose any requirements, it provides a common source of sea-level rise projections for consideration within the programs specified by CRRA.

Comment 4: CRRA mentions hazard risk analysis data numerous times. It is clearly appropriate to require a hazard risk analysis associated with projects at risk from sea-level rise, storm surges and flooding associated with extreme weather events. (Warren)

Response to Comment 4: The Department received this comment after the public comment deadline. Moreover, the subject of this comment is beyond the scope of Part 490, which is limited to projected sea-level rise rather than hazard risk analysis.

In any case, pursuant to CRRA, the Department, in consultation with the Department of State, is developing implementation guidance that will describe how to consider sea-level rise, including hazard risk analysis and sources of data, in the programs specified by CRRA.

Six Feet of Sea-level Rise not Plausible

Comment 5: If the Earth is 70% water and water seeks its own level, how could there ever be more than an almost imperceptible rise in sea level, even if all the ice were to melt? (DeLong)

Response to Comment 5: The subject of this comment is beyond the scope of Part 490, as it does not address the proposed regulation. In any case, the West Antarctic Ice Sheet (WAIS) is more than 6500 feet thick and comprises enough ice to raise global sea levels about 16 feet if completely melted. The Greenland Ice Sheet is more than 9800 feet thick and would contribute about 23 feet of global sea level rise if melted. Paleoclimatic evidence indicates that melt of the Greenland Ice Sheet and possibly of the WAIS led to 13 to 20 feet of global sea-level rise when global temperatures were 3 to 5°C warmer than at present, although it would take centuries or millennia for this level of melt to occur. (Intergovernmental Panel on Climate Change, https://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch19s19-3-5-2.html).

Comment 6: The Regulatory Impact Statement states that "Inclusion of unlikely but plausible projections provides benchmarks against which long-term decisions, e.g., those regarding critical infrastructure and land-use change, can be evaluated for low-probability but high-consequence events." The Alliance suggests that a six foot of sea level rise is so unlikely that it does not reach the threshold of "plausible." The Regulatory Impact Statement glosses over the uncertainty regarding the rate of future ice melt but overstates the necessity to consider the potential for more rapid ice melt. The Regulatory Impact Statement highlights aspects of the Bamber and Aspinall (2013) paper supporting its sea level rise assertions but does not address the IPCC observation that in that paper "[E]xpert estimates of contributions from this source have a wide spread, indicating a lack of consensus on the probability for such a collapse." Nor does it recognize that there is even more uncertainty related to the timing of sea-level rise in the event of a rapid ice melt event. In other words it is very unlikely that ice sheets will collapse and it is even more unlikely that sea level rise would respond if that happened to raise sea level six feet by 2100. As a result, the six-foot sea level rise projection is not sufficiently robust to be considered "plausible." (Caiazza)

Response to Comment 6: The Department acknowledges the lack of expert consensus regarding the likely rate of ice sheet melt and potential for ice sheet collapse. However, as noted in the RIS (p. 12), at least three of the 13 respondents to Bamber and Aspinall's (2013) surveys significantly increased the upper bounds of their projections between the two surveys, leading the authors to conclude there was "a growing view that significant ice-sheet instability in the WAIS could initiate in the coming century."

Regardless, Part 490 includes a range of projections of sea-level rise. The projection distribution constitutes a range suitable for risk-based planning and review of projects of varying projected life times and criticality. Part 490 explicitly defines the "high projection" in the regulation as being "very unlikely" to occur. The Department maintains that it is prudent to include a high, albeit unlikely, projection to enable consideration of the

consequences of low-probability but high-consequence events. The manner in which the high projection should be considered in the context of particular projects will be addressed through the CRRA implementation guidance currently being developed by the Department in consultation with the Department of State.

Finally, in response to this and other comments, the Department substantially revised the definition of "high projection" in subdivision 490.3(i). Pursuant to this revision, in addition to being "very unlikely" to occur, the "high projection" is defined as being "associated with high rates of melt of land-based ice." This revision is intended to acknowledge the fact that, if the high projection is reached by a given time interval, it would be associated with high rates of melt of land-based ice.

Comment 7: In order for the six foot of sea-level rise projection to be considered credible, the Regulatory Impact Statement must explain why the conclusions of the IPCC in the following were ignored:

Page 1140: For the period 2081-2100, compared to 1986-2005, global mean sea level rise is likely (medium confidence) to be in the 5 to 95% range of projections from process-based models, which give 0.26 to 0.55 m for Representative Concentration Pathway 2.6, 0.32 to 0.63 m for RCP4.5, 0.33 to 0.63 m for RCP6.0, and 0.45 to 0.82 m for RCP8.5. For RCP8.5, the rise by 2100 is 0.52 to 0.98 m.

Page 1186: Only the collapse of marine-based sectors of the Antarctic ice sheet could cause GMSL rise substantially above the likely range during the 21st century. Expert estimates of contributions from this source have a wide spread (Bamber and Aspinall, 2013), indicating a lack of consensus on the probability for such a collapse. The potential additional contribution to GMSL rise also cannot be precisely quantified, but there is

medium confidence that, if a collapse were initiated, it would not exceed several tenths of a metre during the 21st century (Section 13.4.4.2)[ ].

In summary, the IPCC RCP8.5 medium confidence 95% upper bound sea level rise by 2100 is 0.98m or 3.2 feet. Even if a collapse of the Antarctic ice sheet were initiated the additional SLR would be 0.3m or 1 foot for a total of 4.2 feet. RISE's 95th-percentile projection of 48 inches at the Battery by 2100 is consistent with the IPCC estimate. (Caiazza)

Response to Comment 7: The Department carefully reviewed these IPCC projections. The projections cited in the comment are based on process models that assume static or linear rates of ice sheet loss over Greenland and Antarctica.

As explained in the RIS, for numerous reasons, the Department based the projections in Part 490 on the ClimAID projections, rather than on other more conservative, less protective projections based primarily on process modeling. As stated in the RIS, the Department acknowledges that the highest projections developed by some other studies are lower than the ClimAID high projections. The ClimAID projections incorporate expert judgment of ice loss based on accelerating rates of melt and seaward movement of ice, positive feedbacks and non-linearities that are not necessarily accounted for in the process-based and statistical modeling approaches described by the IPCC.

In addition, as noted in RIS (p.15), researchers have cautioned that focusing on the most probable outcomes can lead to vulnerability or maladaptation. Furthermore, and as described above in response to comment 6, Part 490 explicitly defines the high projection as "very unlikely." Finally, in response to this and other comments, as

noted above in response to comment 6, the Department substantially revised the definition of the term "high projection" in subdivision 490.3(i) to note that the "high projection" is "associated with high rates of melt of land-based ice."

Base Projection on ClimAID Report

Comment 8: State projections should be based on the ClimAID report, including a high projection of approximately 6 feet of sea-level rise by 2100. (Subbarama, Scata, Zarrilli, Gruskin, Warren).

Response to Comment 8. The Department agrees. As explained in the RIS, the State's projections in Part 490 are based on the ClimAID report, including a high projection of approximately six feet of sea-level rise at the various locations by 2100.

Alternative Approach Suggested

Comment 9: The Department should adopt a "pledge and review" approach to establish sea-level rise policy. Sea-level rise planning values would be based on observed rates of rise at specified tide gauges during 5-year periods and would be adjusted according to the observed rates of sea-level change during the most recent 5-year period at the selected gauges.

(Caiazza)

Response to Comment 9: ECL § 3-0319, as added by CRRA, requires the Department to consider certain information in promulgating science-based State sea-level rise projections. In particular, CRRA requires the Department to consider information including, but not limited to, reports of the IPCC, the National Climate Assessment, State Sea Level Rise Task Force report, New York City Panel on Climate Change and other regional, state and local reports. In addition, ECL § 3-0319 requires the Department to update its sea-level rise

projection regulations at least every five years. As required by CRRA, the Department will update sea-level rise projections through future action.

While the Department has not yet determined the precise review process it will use, the Department has concerns with the pledge and review approach suggested. The first is its reliance on a limited number of tide gauges. As can be seen from the table provided in the comments, which includes the Battery and Montauk Point, local factors can affect sea-level change at individual stations so that significantly different, even opposite, trends are indicated, even from proximate stations. Secondly, the pledge and review approach would yield planning values based only on historical trends in rise or rates of rise, whereas CRRA requires consideration of future climate risk. As described in the RIS, the rate of sea-level rise is not projected to be constant based on historical values, but is instead projected to accelerate with increased warming. Projections based solely on the pledge and review approach could be easily skewed by short-term, localized phenomena, and the approach would fail to account for acceleration of sea-level rise that would occur with projected warming.

Finally, in response to this and other comments, the Department substantially revised the definition of the term "low projection" in subdivision 490.3(m). Pursuant to this revision, in addition to being "very likely" to be exceeded, the "low projection" is defined as being "consistent with historical rates of sea-level rise." This revision accounts for the fact that future sea-level rise is not projected to be consistent with historical trends, but is instead projected to accelerate with increased warming.

Rulemaking Procedure

Comment 10: This is an improper and illegal rulemaking as the proposed regulation has no context and cannot be understood by the regulated community. (Hamling)

Response to Comment 10: The Department disagrees as this claim is incorrect. The promulgation of Part 490 complies with the State Administrative Procedure Act (SAPA) and all other rulemaking requirements. The Legislature established the context of Part 490 through the statutory language of CRRA. Moreover, the context of the regulation is further described in the RIS.

In addition, even before the formal proposal of Part 490 pursuant to SAPA, the Department held an extensive public stakeholder outreach process. As summarized in the RIS, this stakeholder outreach process included five public informational and listening sessions, at which Department staff presented background on CRRA, including the overall context of the regulation, as well as the scientific information the Department considered in developing Part 490.

As explained in the RIS, Part 490 does not impose any requirements on any entity. CRRA was enacted with the purpose of ensuring that decisions regarding certain State permits, regulations, and expenditures include consideration of the effects of climate risk, including sea-level rise and extreme weather events. Part 490 implements one component of this objective by providing a common source of sea-level rise projections for consideration within the programs specified by CRRA.

The adoption of Part 490 is the first step in the overall process to implement CRRA, as the Department is also currently preparing guidance, in consultation with the Department of State, regarding the implementation of CRRA. This guidance will address, among other things, how consideration of the sea-level rise projections in Part 490 should be incorporated into each of the permitting and other programs enumerated in CRRA. CRRA

requires this guidance to be adopted by January 1, 2017. Applicants for relevant permits or funding programs will not be required to consider Part 490's sea-level rise projections pursuant to CRRA until such guidance is adopted.

Comment 11: Precluding meaningful input while simultaneously putting into place a binding requirement affecting future regulatory enactments is illegal and is an improper attempt to insulate the regulation from challenge. (Hamling)

Response to Comment 11: Through the promulgation of Part 490, the Department neither precluded meaningful input nor put into place a binding requirement affecting future regulatory enactments.

First, rather than precluding meaningful input, as explained in the RIS and in response to comment 10, the Department provided several opportunities for input on Part 490, including through stakeholder outreach before the formal proposal of the regulation for public comment. Moreover, the Department will also provide additional opportunities for meaningful input on future CRRA implementation actions, including the implementation guidance described in the RIS and in response to comment 10.

Second, as explained in the RIS and in response to comment 10, Part 490 does not impose any binding requirements on any entities. Instead, Part 490 implements one component of CRRA by providing a common source of sea-level rise projections for consideration within the programs specified by CRRA. Therefore, for this and other reasons, Part 490 does not impose a binding requirement affecting future regulatory enactments.

Finally, as required by CRRA, the Department, in consultation with the Department of State, is developing implementation guidance under CRRA. To the extent the Department undertakes any future regulatory

enactments that incorporate Part 490, such future action will be subject to SAPA and other procedural rulemaking requirements, including an opportunity for public comment.

Comment 12: The regulated community cannot meaningfully comment on the sea-level rise projection numbers in the absence of the remainder of the regulatory scheme. (Hamling)

Response to Comment 12: The RIS and response to comments 10 and 11 describe the manner in which Part 490 fits into the overall scheme of CRRA. The Legislature established the context of Part 490 through the statutory language of CRRA. Part 490 implements one component of CRRA by providing a common source of sea-level rise projections for consideration within the programs specified by CRRA.

A primary reason for adopting Part 490 first, prior to the finalization of CRRA implementation guidance, is the statutory language of CRRA itself.

In any case, as described in the RIS and in response to comment 10, the adoption of Part 490 is the first step in the overall process to implement CRRA, as the Department is also currently preparing guidance, in consultation with the Department of State, regarding the implementation of CRRA. This guidance will address, among other things, how consideration of the sea-level rise projections in Part 490 should be incorporated into each of the permitting and other programs enumerated in CRRA. CRRA requires this guidance to be adopted by January 1, 2017.

As explained in the RIS and in response to comments 3, 10 and 11, Part 490 does not impose any requirements on any entity. As required by ECL § 3-0319, Part 490 establishes science-based State sea-level rise projections. In other words, the only subject of the rulemaking itself is the scientific projection of sea-level rise. As

explained in response to comment 11, the regulated community can meaningfully comment on this single subject of the regulation, even prior to the finalization of implementation guidance under CRRA.

The Department recognizes that the regulated community is interested in both the sea-level rise projections numbers in Part 490, as well as the manner in which consideration of these projections will be incorporated into the programs specified by CRRA. As described in response to comment 11, the Department will provide additional opportunities for meaningful input on future CRRA implementation actions, including the implementation guidance described in the RIS and in response to comment 10. Furthermore, to the extent the Department undertakes any future regulatory enactments that incorporate Part 490, such future action will be subject to SAPA and other procedural rulemaking requirements, including an opportunity for public comment.

Finally, applicants for relevant permits or funding programs will not be required to consider Part 490's sea-level rise projections pursuant to CRRA until such guidance is adopted.

Comment 13: Although the Department's webpage states that all of the regulatory documents are available on the Department's website, the required regulatory flexibility analysis and the rural area flexibility analysis are not included. (Hamling)

Response to Comment 13: All of the regulatory documents required under SAPA for Part 490 were available on the Department's website at the time of the rule's proposal. Moreover, such regulatory documents remain available on the Department's website.

As part of the proposal of Part 490, the Department provided to the Department of State statements in lieu of a Rural Area Flexibility Analysis (RAFA) and a Regulatory Flexibility Analysis for Small Businesses and Local

Governments (RFASBLG). As described in such statements, both a RAFA and a RFASBLG are not required for Part 490.

In particular, as described in the RIS and in response to comments 3, 10, 11, and 12, Part 490 does not impose any requirements on any entity. Instead, Part 490 provides a common source of sea-level rise projections for consideration within the programs specified by CRRA. Because Part 490 does not impose any requirements on any entity, it will not create any new or additional effect on rural communities, and therefore a RAFA is not required. Similarly, because Part 490 does not impose any requirements on any entity, no small business or local government will be directly affected by this rule, and therefore a RFASBLG is not required.

Comment 14: Enactment of Part 490 as a stand-alone regulation results in improper segmentation. Proposed Part 490 enacts numerical standards that will, pursuant to the express terms of the CRRA, be utilized as part of permitting requirements for thirteen (13) separate regulatory programs administered by the Department. Promulgating these numerical standards without considering the entirety of the CRRA regulatory program, as a matter of law, fails to consider the entire "action" as required by SEQRA. (Hamling)
Response to Comment 14: The Department disagrees. Pursuant to Article 8 of the ECL (the State Environmental Quality Review Act [SEQRA]), a Short Environmental Assessment Form, Coastal Assessment Form, and a Negative Declaration have been prepared and are on file for the promulgation of Part 490.

Part 490 does not enact numerical standards. Instead, as described in the RIS and in response to comments 3, 10, 11, 12, and 13, Part 490 will serve as a common source of sea-level rise projections for consideration within the programs specified by CRRA. As described in the RIS and in response to comments 10, 11, and 12, the manner in which these projections will be incorporated into the programs specified by CRRA will be addressed

through the CRRA implementation guidance currently being developed by the Department in consultation with the Department of State.

Moreover, as explained in response to comment 12, a primary reason for adopting Part 490 first, prior to the finalization of CRRA implementation guidance, is the statutory language of CRRA itself. As explained in response to comment 11, Part 490 does not impose a binding requirement affecting future regulatory enactments. As explained in response to comments 11 and 12, to the extent the Department undertakes any future regulatory enactments that incorporate Part 490, such future action will be subject to SAPA and other requirements. This includes the application of SEQRA to any future regulatory enactment that incorporates Part 490, as well as to any SEQRA "action" that the Department undertakes in its implementation of CRRA.

Definitions

Comment 15: Definitions should more clearly articulate the likelihood of that rate of sea-level rise occurring. (Scata, Gruskin)

Response to Comment 15: As described in the RIS, the projections included in Part 490 are not associated with specific probabilities or likelihoods, other than the qualitative descriptions provided within each definition. Instead, the projections are based on the outputs of more than 20 global climate models, run for two representative concentration pathways and downscaled to New York. The percentiles reported by ClimAID refer to the range of model outputs, e.g., 90th-percentile means that 90 percent of the model outputs were equal to or less than that projection and 10 percent of the model outputs were greater. Because these models are not independent, i.e., a bias in one model may be repeated in other models, it cannot be assumed that the output distribution accurately reflects the probability distribution of levels of sea-level rise. Therefore, there is no way to describe an accurate probability distribution for various levels of future sea-level rise from the ClimAID

projections. Rather, the Department's terminology and definitions provide a qualitative indication of the relative likelihood of the specified rise.

In addition, in response to this and other comments, as described above in response to comments 6, 7, and 9, the Department substantially revised the definitions of the terms "low projection" and "high projection." These revisions note that the "low projection" is "consistent with historical rates of sea-level rise," while the "high projection" is "associated with high rates of melt of land-based ice."

List of Commenters

	Organization	Name	Date
1	N/A	Susan Hayward	October 30, 2015
2	N/A	Dennis Delong	November 10, 2015
3	Pratt Institute	Yisrael Gladstein	December 6, 2015
4	Pratt Institute	Samudyatha Subbarama	December 9, 2015
5	Environmental Energy Alliance of New York	Roger Caiazza	December 16, 2015
6	City of New York	Daniel Zarrilli	December 17, 2015
7	Audubon New York	Erin Crotty	December 17, 2015
8	New York Construction Materials Association	David Hamling	December 22, 2015
9	Natural Resources Defense Council	Joel Scata	December 28, 2015
10	The Nature Conservancy	Stuart Gruskin	December 28, 2015
11	Citizens Environmental Coalition	Barbara Warren	December 31, 2015

Supporting Documents

Notice of Revised Rule Making - RAFA Attachment

Attached determination explaining why a revised RAFA, is not required under item 16.B

Rural Area Flexibility Analysis (RAFA)

A revised RAFA is not required for Part 490. The Department is proposing this rulemaking to provide a common source of sea-level rise projections for consideration within programs specified by the Community Risk and Resiliency Act, Chapter 355 of the Laws of 2014. Because the proposed rule will not impose any requirements on any entity, it will not create any new or additional effect on rural communities.

Notice of Revised Rule Making - JIS Attachment

Attached determination explaining why a revised JIS, is not required under item 17.B.

Job Impact Statement (JIS)

A revised JIS is not required for Part 490. The Department is proposing this rulemaking to provide a common source of sea-level rise projections for consideration within programs specified by the Community Risk and Resiliency Act, Chapter 355 of the Laws of 2014. Because the proposed rule will not impose any requirements on any entity, it will not have any effect on jobs or employment opportunities.

Notice of Revised Rule Making - RFASBLG Attachment

Attached determination explaining why a revised RFASBLG is not required under item 15.B.

Regulatory Flexibility Analysis for Small Businesses and Local Governments (RFASBLG)

A revised RFASBLG is not required for Part 490. The Department is proposing this rulemaking to provide a common source of sea-level rise projections for consideration within programs specified by the Community Risk and Resiliency Act, Chapter 355 of the Laws of 2014. Because the proposed rule will not impose any requirements on any entity, no small business or local governments will be directly affected by the rule.