



June 1, 2017

Regulatory Affairs Legal Division
Office of Chief Counsel
Federal Emergency Management Agency
500 C Street SW, Room 8NE
Washington, DC 20472-3100

**Re: National Flood Insurance Program Draft Nationwide Programmatic
Environmental Impact Statement**

Dear Federal Emergency Management Agency (FEMA):

Thank you for this opportunity to comment on the draft Nationwide Programmatic Environmental Impact Statement (DNPEIS) for the National Flood Insurance Program (NFIP). The Sabin Center for Climate Change Law at Columbia Law School recognizes the critical importance of the flood insurance to many Americans' decisions about where to live and to invest their money and resources and submits the following observations about and recommendations for the DNPEIS's approach to climate change:

- (1) The DNPEIS impermissibly ignores the NFIP's effect on floodplain development:** One of the stated goals of the NFIP Act is to "drive development away from" flood prone areas. Whether the NFIP has in fact deterred – or conversely, induced – floodplain development should be explored both as a policy matter and because it has critical implications for the environmental outcomes of the program. FEMA stated that it would analyze this issue in the scoping documents for this review, but has summarily dismissed the issue in the DNPEIS. This violates the requirement of the National Environmental Policy Act (NEPA) to evaluate indirect effects, including growth-inducing effects.
- (2) The DNPEIS impermissibly ignores how climate change may exacerbate the environmental impacts and public health risks associated with induced floodplain development and fails to explore alternatives or mitigation measures that might address risks that are compounded by climate change:** The DNPEIS contains an extensive discussion of how climate change will affect floodplains and coastlines as part of the discussion of the "affected environment" for this program. However, because FEMA has ignored the impacts of the NFIP on floodplain development, it has also ignored the ways in which climate change will exacerbate risks associated with induced floodplain development (and correspondingly, whether and to what extent the program is increasing human exposure to climate-related risks). The DNPEIS also fails to consider potential alternatives and mitigation measures that could mitigate these risks.

- (3) The DNPEIS’s reasoning fails to adequately explain FEMA’s decision to not incorporate climate change impacts in flood maps:** In the section titled, Incorporating Climate Change in Flood Maps, the DNPEIS states that FEMA will make no changes to its regulatory program involving “the mapping of climate change” because currently available technical methodologies cannot provide “consistent, credible results.” But if “credible” results are FEMA’s aim, then the NFIP *must* provide policyholders and communities with information about future climate change-related impacts based on the latest science. As indicated in section 5, there are multiple credible sources of data on downscaled sea level rise projections that could be incorporated into flood maps’ advisory layers.
- (4) The DNPEIS should draw on what the Technical Mapping Advisory Committee’s report on future conditions actually said:** The DNPEIS refers to the Technical Mapping Advisory Committee (TMAC)’s 2015 report on future conditions and flood risk, but fails to take up that report’s recommendations and instead announces a decision that runs contrary to them.
- (5) FEMA should be aware of the numerous high-quality sea level rise and flood risk projections developed for downscaled applications.**

These observations and recommendations are discussed in greater detail below.

1. The DNPEIS impermissibly ignores the NFIP's effect on floodplain development.

When Congress established the NFIP in 1968, it noted that one objective of the program was to discourage new development in areas susceptible to flooding.¹ Congress therefore explicitly recognized that the implementation of the NFIP would have some effect on floodplain development. At the same time, Congress recognized that “many factors have made it uneconomic for the private insurance industry alone to make flood insurance available to those in need of such protection” and thus a federal flood insurance scheme was needed to help mitigate flood-related losses.² In the years since then, the availability of publically subsidized federal flood insurance has benefitted NFIP participants, but many commentators are concerned that it has also had the unintended effect of encouraging floodplain development, thus undermining a core goal of the statute.³

¹ 42 U.S.C. § 4001(e) (recognizing that the NFIP could be used to “guide the development of proposed future construction... away from locations which are threatened by flood hazards”).

² 42 U.S.C. § 4001(b).

³ See Walter A. Rosenbaum & Gary Boulware, American Institutes for Research, *The Developmental and Environmental Impact of the National Flood Insurance Program: A Summary Research Report*, prepared for FEMA as part of the 2001-2006 Evaluation of the National Flood Insurance Program (2006); Beth Davidson, *How Quickly We Forget: The National Flood Insurance Program and Floodplain Development in Missouri*, 19 WASHINGTON UNIVERSITY JOURNAL OF LAW & POLICY 365 (2005).

The question of whether and to what extent the NFIP is inducing or discouraging floodplain development should be central to this environmental review, both as a policy matter (to determine whether the program is fulfilling statutory objectives) and because induced floodplain development is the primary channel through which the NFIP affects the environment. Indeed, FEMA even cited this issue as one of the driving forces behind its decision to prepare a full programmatic EIS.⁴ But FEMA has apparently reversed course since the scoping phase of this environmental review: the DNPEIS ignores the effects of the NFIP on floodplain development, and as a result, it contains almost no analysis of the program's environmental impacts.⁵ FEMA has justified this omission by asserting that induced development is neither a direct nor indirect effect of the NFIP. For the reasons that follow, we believe that induced development is precisely the sort of indirect effect that must be analyzed in the DNPEIS.

In its NEPA analysis, FEMA is required to consider "indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."⁶ Such effects "may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems."⁷ If an action undergoing NEPA review is likely to significantly affect development in a particular area, that effect is almost always treated as an indirect effect in NEPA documents.⁸ Where there are uncertainties about the effect of a proposed action on development, but that effect may nonetheless be significant, the agency must disclose this uncertainty and include available information about the impact in the EIS.⁹ Moreover, the degree to which an effect is "highly uncertain or involve[s] unique or unknown risks" is one of the factors that would support a finding that the effect is significant.¹⁰

FEMA asserts that the causation and foreseeability elements are lacking in this context, specifically that the "linkage between the availability of flood insurance and resulting impacts on development or the environment is tenuous" and that the NFIP "does not cause development to occur, and does not play a significant role in facilitating or encouraging floodplain development."¹¹ But FEMA fails to cite any authority to support these assertions, and ignores congressional recognition and other existing evidence of the relationship between the availability of subsidized flood insurance and floodplain development.

⁴ FEMA, *NFIP Programmatic Environmental Impact Statement: Proposed Areas for Analysis* (2012); FEMA, *National Flood Insurance Program (NFIP) Programmatic EIS (PEIS): The Environmental Impact Statement Process* (2012).

⁵ FEMA, *National Flood Insurance Program Draft NPEIS* (2017) at ES-8 (Table ES-2 shows no adverse environmental effects).

⁶ 40 C.F.R. § 1508.8(b).

⁷ *Id.*

⁸ *See, e.g., City of Davis v. Coleman*, 521 F.2d 661, 675 (9th Cir. 1975); *Nat. Res. Def. Council, Inc. v. Dep't of Energy*, No. C-04-04448 SC, 2007 WL 1302498, at *16 (N.D. Cal. May 2, 2007), amended, No. C-04-04448 SC, 2007 WL 2349288 (N.D. Cal. Aug. 15, 2007); *W. Land Exch. Project v. U.S. Bureau of Land Mgmt.*, 315 F. Supp. 2d 1068, 1089 (D. Nev. 2004).

⁹ 40 C.F.R. § 1502.22.

¹⁰ 40 C.F.R. § 1508.27.

¹¹ NPEIS at 4-4.

As noted above, the primary way in which the NFIP affects floodplain development is through the provision of subsidized flood insurance. There are two types of subsidies offered through the program. The first is a dedicated subsidy for properties that were “grandfathered” into the program¹² – FEMA explicitly recognizes that these rates are “subsidized” and contemplates different strategies for rolling back these subsidies in the DNPEIS (and yet fails to consider how rolling back subsidies may affect floodplain development).¹³ The second is a more general subsidy that applies to many other NFIP participants: these property owners are able to obtain federal insurance even where private insurance would be prohibitively expensive.¹⁴ As a result of these subsidies, the program has been operating at a massive deficit.¹⁵ This was precisely what drove Congress to enact the Biggert-Waters Flood Insurance Act, which was aimed at phasing out the subsidies and increasing flood insurance premiums.¹⁶ While many provisions of that Act were later repealed, the underlying concern about federal flood insurance subsidies remains.

The provision of subsidized flood insurance creates an incentive for development in floodplains. A 2006 study commissioned by FEMA confirmed this fact. The authors of that study acknowledged that the NFIP’s influence on floodplain development was “nuanced” but nonetheless found ample evidence that the program does “reduce barriers to development by reducing economic and flood risk to property owners.”¹⁷ The study also found that: (i) the availability of flood insurance is one of the two most significant factors driving decisions to develop, buy or build in flood risk areas (the other factor being the property characteristics), and (ii) the NFIP’s influence on floodplain development “appears to be greatest in coastal states and communities.”¹⁸

At the same time, the study recognized that the NFIP can also “encourage floodplain conservation and the protection of environmental values,” primarily through flood risk management requirements.¹⁹ This is another way in which the NFIP can affect floodplain development and the corresponding environmental outcomes, and is therefore another issue that should be considered in the DNPEIS.

In sum: Congress intended for the NFIP to affect floodplain development patterns when it first introduced the program, and empirical studies have found that the NFIP does indeed affect

¹² U.S. Government Accountability Office (GAO), *Flood Insurance: Public Policy Goals Provide a Framework for Reform*, GAO-11-670T (2011).

¹³ See, e.g., NPEIS at 4-11.

¹⁴ GAO (2011), *supra* note 12; Omri Ben-Shahar & Kyle Logue, *The Unintended Effects of Government-Subsidized Weather Insurance*, REGULATION (Fall 2015); Sarah Fox, *This is Adaptation: The Elimination of Subsidies Under the National Flood Insurance Program*, 30 COLUMBIA JOURNAL OF ENVIRONMENTAL LAW 205 (2014); Scott Gabriel Knowles & Howard C. Kunreuther, *Troubled Waters: The National Flood Insurance Program in Historical Perspective*, 26 JOURNAL OF POLICY HISTORY 327 (2014).

¹⁵ Knowles & Kunreuther (2014), *supra* note 14.

¹⁶ Ben-Shahar & Logue (2015), *supra* note 14.

¹⁷ Rosenbaum & Boulware (2005) at ix.

¹⁸ *Id.*

¹⁹ *Id.*

development – although perhaps not in the ways that Congress initially intended. There are still many unanswered questions about the nature of this effect,²⁰ and FEMA has explicitly recognized a need to conduct a more in-depth assessment on this topic.²¹ FEMA’s new position (that the NFIP does not affect floodplain development) conflicts with its prior statements as well as Congress’s vision of what the program should achieve. FEMA has already dedicated considerable time and resources to this review: rather than ignoring what is arguably the most significant environmental question pertaining to the program, FEMA must use this opportunity to conduct a meaningful review of how the NFIP affects floodplain development and the corresponding environmental outcomes.

2. The DNPEIS impermissibly ignores how climate change may exacerbate the environmental impacts and public health risks associated with induced floodplain development and fails to explore alternatives or mitigation measures that might address risks that are compounded by climate change.

To comply with NEPA, federal agencies must evaluate an action in relation to foreseeable future baseline environmental conditions.²² That is, agencies like FEMA must define the timeframe appropriate for the action—in this case, the next fifty years or more²³—and define an environmental baseline that incorporates conditions anticipated to be relevant to the action and its impacts over that timeframe.²⁴ In instances like the present action, where materially different future environmental conditions are foreseeable and highly relevant to the goals of the lead agency for the action at issue, this amounts to a requirement that an agency consider how environmental conditions may change over the duration of the project. In other words, FEMA must account for the effects of climate change in the area affected by the NFIP.²⁵

²⁰ NFIP Evaluation Final Report Working Group, *An Evaluation of the National Flood Insurance Program: Final Report*, prepared for FEMA as part of the 2001-2006 Evaluation of the National Flood Insurance Program (2006) at 39.

²¹ FEMA, *NFIP Programmatic Environmental Impact Statement: Proposed Areas for Analysis* (2012); FEMA, *National Flood Insurance Program (NFIP) Programmatic EIS (PEIS): The Environmental Impact Statement Process* (2012).

²² See CEQ, *Considering Cumulative Effects under the National Environmental Policy Act* 29, 41, 42, 50 (1997) [hereinafter “Considering Cumulative Effects Under NEPA”], available at <https://perma.cc/X3E8-KDR8>; 40 C.F.R. 1502.15 (defining “affected environment”); see also *California ex rel. Imperial Cty. Air Pollution Control Dist. v. U.S. Dept. of Interior* (9th Cir. 2014) (agency properly considered future conditions when establishing “no action” alternative); *Or. Nat. Resources Council Fund v. Brong* (9th Cir. 2007) (agency failed to consider future effects of other actions in cumulative effects analysis); *Klamath-Siskiyou Wildlands ctr. v. Bureau of Land Management* (9th Cir. 2004) (agency failed to consider future effects of other actions in cumulative effects analysis); *Am. Canoe Ass’n v. White* (N.D. Ala., 2003) (agency failed to consider future condition of project).

²³ FEMA has not specified a timeframe for the duration of the NFIP, but the buildings that are constructed as a result of the program could very well remain in place for fifty years or more.

²⁴ *Supra* note 22. See also *California ex rel. Imperial Cty. Air Pollution Control Dist. v. U.S. Dept. of Interior* (9th Cir. 2014) (agency properly considered future conditions when establishing “no action” alternative); *Or. Nat. Resources Council Fund v. Brong* (9th Cir. 2007) (agency failed to consider future effects of other actions in cumulative effects analysis); *Klamath-Siskiyou Wildlands ctr. v. Bureau of Land Management* (9th Cir. 2004) (agency failed to consider future effects of other actions in cumulative effects analysis); *Am. Canoe Ass’n v. White* (N.D. Ala., 2003) (agency failed to consider future condition of project).

²⁵ This is sometimes referred to as a “reverse” environmental impact analysis. See Michael Gerrard, *Reverse Environmental Impact Analysis: Effect of Climate Change on Projects*, 247(45) *New York Law Journal* (2012);

The critical question is whether climate change will exacerbate environmental risks associated with the NFIP and vice versa. There are several ways in which the NFIP and climate change may compound risks associated with flooding:

- First, there is the possibility of induced development: if the NFIP does indeed encourage development in floodplains due to lower insurance costs, then the program is increasing the exposure of people and property to flood risks that will be exacerbated by sea level rise and extreme precipitation events. FEMA should account for this when evaluating the extent to which the program induces floodplain development and the corresponding environmental impacts.
- Second, there is the transfer of information about flood risk and risk reduction practices: the NFIP translates estimates of flood risk for a given area into mapping data and provides information about how to mitigate flood risk to residents and localities. If the maps and information provided are not updated to reflect the possibility of increased flooding due to sea level rise and heavy precipitation events, then FEMA will be providing inaccurate information that could lead to maladaptive choices.
- Third, the NFIP establishes specific requirements for construction and development in floodplains. Again, if these requirements do not reflect the possible effects of climate change on flood risk, then they may result in maladaptation, including investments in flood protection measures that will ultimately prove inadequate.

An analysis of climate change impacts is also necessary in order to fulfill the stated purpose of the DNPEIS, which is “to evaluate proposed modifications to the National Flood Insurance Program” in conformity with the requirements of the National Environmental Policy Act of 1969 (NEPA).²⁶ Underlying that purpose is the fact that, “[f]or the NFIP to remain sustainable and to increase its fiscal soundness, its premium structure must reflect the true risks and costs of flooding.”²⁷ FEMA cannot determine the “true risks and costs of flooding” without accounting for how climate change may affect those risks and costs.

By evaluating how climate change may exacerbate flood risks, FEMA will be in a better position to review potential alternatives and mitigation measures to help reduce those risks. For example, one alternative proposed by FEMA would be to phase out flood insurance subsidies. FEMA may find that a more expedient phase out of such subsidies is warranted in order to remove incentives for floodplains development in certain high-risk areas, such as low-lying coastlines. FEMA could also use data about the effects of climate change to introduce more protective flood risk management standards. Finally, FEMA should consider how updating the Flood Insurance Rate Maps (FIRMs) to account for climate change impacts would reduce flood risk and incentives for

Teresa Parejo Navajas, *Reverse Environmental Assessment Analysis for the Adaptation of Projects, Plans, and Programs to the Effects of Climate Change in the EU: Evaluation of the Proposal for an EIA Directive* (Columbia Public Law Research Paper No. 14-445, 2015).

²⁶ NPEIS at 1-1.

²⁷ *Id.* at 1-4.

floodplains development. As discussed below, TMAC has recommended that FEMA inform participants in the NFIP about how sea level rise will affect flood risk, and FEMA has a legal obligation to incorporate TMAC’s recommendations into FIRM and flood insurance study updates. FEMA could fulfill its obligation by adding an advisory map layer to FIRMs showing the effects of sea level rise—an action that should be evaluated in the DNPEIS. FEMA should also consider the option of incorporating sea level rise projections into the FIRMs such that those projections would influence insurance rates and what effect this action would have on floodplain development.

3. The DNPEIS’s reasoning does not adequately support FEMA’s decision to not incorporate climate change impacts in flood maps.

FEMA indicates in its DNPEIS that it will not incorporate climate change impacts into floodplain maps on a programmatic basis. It does so in the paragraph captioned “Incorporating Climate Change in Flood Maps,” which responds to commenters who encouraged FEMA to incorporate climate change impacts into its maps. That DNPEIS paragraph states in pertinent part as follows:

The TMAC 2015 Future Conditions Risk Assessment and Modelling [sic] Report . . . note[s] that there is not sufficient, actionable science for addressing climate change impacts to watershed hydrology and hydraulics. At this time, it would be inappropriate for FEMA to make regulatory changes to its national program that would require the mapping of climate change without sufficient, actionable science and mapping methodologies to implement these changes and deliver consistent, credible results.²⁸

To begin, this excerpt’s reference to the 2015 TMAC report is selective and misleading. The report does state that “[n]o actionable science exists at the current time to address climate change impacts to watershed hydrology and hydraulics,”²⁹ but only in reference to *riverine* watersheds. The DNPEIS nonetheless reproduces that language in a way that wrongly implies that the TMAC report used it to describe the state of the science with respect to coastal floodplains as well as riverine ones. The paragraph’s next sentence uses the same key language—“actionable science”—and implies that its point builds on a purportedly general conclusion of the TMAC. As explained further in part four, below, this was not a general conclusion and the DNPEIS’s implication is at odds with what TMAC actually recommended in its 2015 report.

There are two further problems with FEMA’s reasoning: an incorrect implicit assumption and an important omission. The assumption is that current flood maps, which ignore climate change and sea level rise, are “credible,” and that incorporating the downscaled projected impacts of climate change into flood maps’ regulatory component would undermine that credibility. Even allowing that downscaled projections of sea level rise and other climate change impacts are generally

²⁸ NPEIS at 2-16.

²⁹ Technical Mapping and Advisory Council, Future Conditions Risk Assessment and Modeling 16 (Dec. 2015) [hereinafter “TMAC (2015)”].

imprecise at the local level, this assumption gets things backwards. The DNPEIS’s own thorough description of climate change and sea level rise³⁰—as well as TMAC’s 2015 report, AECOM’s 2013 report,³¹ and other resources cited in the DNPEIS³²—all make plain that current maps are credible only if one reads them as *not* describing the foreseeable future, because the climate and coastlines will be different in future decades than they are according to existing flood maps. As noted in parts 1 and 2 of these comments, however, policyholders and communities rely heavily on these maps to make decisions about investments whose life will span decades. Indeed, as the DNPEIS itself states, “[t]he FIRM and FIS report provide States and communities with the information needed for land use planning and to reduce risk to floodplain development.”³³ In addition to all these points—which draw on the DNPEIS’s own contents and citations—it should also be noted that New York State, for example, by issuing sub-regional sea level rise projections through 2100, has taken steps that belie FEMA’s suggestion that downscaling projected climate change and sea level rise impacts cannot improve flood mapping at the present time.³⁴

The important omission in FEMA’s reasoning relates to the *nonregulatory* aspects of flood maps. The DNPEIS’s explanation of why climate change should be ignored only refers to “regulatory changes,” and fails to mention the advisory components of flood maps, such as future conditions layers, which do not prescribe anything to policyholders or communities but only supply them with information about salient risks. This omission should be corrected because incorporating climate change impacts into advisory mapping information would be the best means of achieving the DNPEIS’s stated goal of ensuring that the NFIP “deliver[s] consistent, credible results.”³⁵

4. Contrary to statements and implications in the DNPEIS, TMAC’s recommendations encourage FEMA to integrate climate change and SLR considerations into NFIP materials, including flood maps.

FEMA’s DNPEIS points to the TMAC 2015 report on future conditions and flood risks as a basis for its conclusion that climate change projections should not inform FEMA flood mapping products “at this time.”³⁶ This conclusion is contrary to several recommendations in TMAC’s future conditions report, however, and FEMA should revise its DNPEIS to more closely conform to what the TMAC report actually recommends. Generally speaking, those recommendations encourage FEMA to provide individuals and communities participating in the NFIP with

³⁰ NPEIS § 3.13.

³¹ See AECOM, *The Impact of Climate Change and Population Growth on the National Flood Insurance Program through 2100* (June 2013) (anticipating that the special flood hazard area in coastal areas will grow 55% on average by 2100 and by 45% in riverine areas; and further that roughly 30% of this change will owe to population growth and 70% to climate change), <http://bit.ly/2qRR9GH>.

³² See, e.g., EPA, *Climate Change Indicators in the United States* (2012), <http://bit.ly/11SjIIs>.

³³ NPEIS at 1-8.

³⁴ See 6 NYCRR 490 (Projected Sea Level Rise – Express Terms), *available at* <http://www.dec.ny.gov/regulations/103877.html> (listing expected sea levels for different regions in New York State at intervals stretching to 2100); Radley Horton et al., *New York City Panel on Climate Change 2015 Report*, Chapter 2: Sea Level Rise and Coastal Storms, 1336 *Ann. N.Y. Acad. Sci.* 36 (2015).

³⁵ NPEIS at 2-16.

³⁶ *Id.*

mapping layers and other forms of nonregulatory information about flood risks arising from climate change impacts, sea level rise chief among them.³⁷

The following list of selected recommendations from TMAC's 2015 report is not exhaustive, but serves to highlight several points that FEMA should consider and incorporate in some fashion in the final version of its DNPEIS:

- Sub-Recommendation 4-4: FEMA should develop guidance for how local zoning and land use planning can be used to identify where and how land use will change in the future, and incorporate that into local hazard and risk modeling.
- Sub-Recommendation 5-2: FEMA should use a scenario approach for future conditions flood hazards calculation and mapping that will allow users to evaluate the robustness of proposed solutions to a range of plausible future conditions including uncertain land use and climate change impacts.
- Sub-Recommendation 5-4: FEMA should use Parriss, et. al., 2012,^[38] or similar global mean sea level scenarios, adjusted to reflect local conditions, including any regional effects (Local Relative Sea Level) to determine future coastal flood hazard estimates. Communities should be consulted to determine which scenarios and time horizons to map based on risk tolerance and criticality.
- Sub-Recommendation 5-5: FEMA should work with other federal agencies (e.g., NOAA, USACE, USGS), the U.S. Global Change Research Program (USGCRP), and the National Ocean Council to provide a set of regional sea-level rise scenarios, based on the Parriss, et al., 2012 scenarios, for the coastal regions of the United States out to the year 2100 that can be used for future coastal flood hazard estimation.
- Sub-Recommendation 5-12: FEMA should incorporate Local Relative Sea Level Rise scenarios into the existing FEMA coastal flood insurance study process in one of the following ways:
 - Direct Analysis – Incorporate sea level rise directly into process modeling (i.e., surge, wave setup, wave runup, overtopping, and erosion) for regions where additional sea level is determined to impact the Base Flood Elevation non-linearly (for example, where a 1-foot sea level rise equals a two-foot or more increase in the base flood).
 - Linear Superposition – Add sea level to the final calculated total water level and redefine the Base Flood Elevation for regions where additional sea level is determined to impact the base flood linearly (for example, 1 foot of sea level rise equals a 1-foot increase in the base flood). Wave effects should be calculated based on the higher Stillwater, including sea level rise.
- Sub-Recommendation 5-13: Maps displaying the location and extent of areas subject to long-term coastal erosion and future sea level rise scenarios should be advisory (non-regulatory) for Federal purposes. Individuals and jurisdictions can use the

³⁷ See TMAC (2015) at 7 (“The TMAC recommends that all future conditions flood risk information be non-regulatory.... However, communities should be allowed—and encouraged—to adopt the future conditions flood hazard products, tools, and information for local regulatory purposes and decision-making on the local level.”).

³⁸ Adam Parriss et al., *Global Sea Level Rise Scenarios for the United States National Climate Assessment*, NOAA Technical Report OAR CPO-1 (Dec. 2012), <http://bit.ly/2qSAC56>.

information for decision-making and regulatory purposes if they deem appropriate. [As noted in TMAC’s report, this can be accomplished by adding advisory layers to the FIRMs that reflect sea level rise.]

- Recommendation 7: Data and analysis used for future conditions flood risk information and products should be consistent with standardized data and analysis used to determine existing conditions flood risk, but also should include additional future conditions data, such as climate data, sea level rise information, long-term erosion data....

As these recommendations and sub-recommendations make clear, TMAC has encouraged FEMA to incorporate climate change impacts into the information—including maps—provided to participants in the NFIP, albeit in an advisory rather than regulatory fashion. FEMA is legally required to incorporate TMAC’s risk assessment and recommendations into its ongoing review and update of the FIRMs.³⁹ This obligation extends to TMAC’s recommendations to incorporate Local Relative Sea Level Rise scenarios into the existing FEMA coastal flood insurance study process and to provide advisory maps showing how sea level rise and erosion will affect flood risk.

5. FEMA should be aware of the numerous high-quality sea level rise and flood risk projections developed for downscaled applications.

The following projections of sea level rise and flood risk were developed by various entities for use in downscaled applications. The resources below are listed in reverse-chronological order and include items that are several years old to illustrate that the task of developing and applying downscaled sea level rise-related flood risk projections is not a new one. The footnote for each resource provides a stable internet link.

- Resources created and maintained by the National Oceanic and Atmospheric Administration (NOAA):
 - Global and Regional Sea Level Rise Scenarios for the United States (Jan. 2017) (including, for the first time, regional projections);⁴⁰
 - A survey of tidal flooding in numerous cities published in 2015;⁴¹
 - NOAA’s digital coast website,⁴² which has supported the development of multiple sea level rise vulnerability assessments for specific localities and assets;⁴³
- Climate Central’s Surging Seas website.⁴⁴
- County of San Mateo, Sea Level Rise Vulnerability Assessment, Draft Report (Apr. 2017);⁴⁵

³⁹ 42 U.S.C. § 4101a(d)(2).

⁴⁰ <https://perma.cc/N9AG-8Y6S>.

⁴¹ <https://perma.cc/9PHH-2ZJ6>.

⁴² <https://coast.noaa.gov/digitalcoast/tools/slr>.

⁴³ See, e.g., Shirley Qian, Capitol Corridor Joint Powers Authority Sea Level Rise Vulnerability Assessment (Aug. 2014), <https://perma.cc/Z7YE-3C2J>.

⁴⁴ <http://sealevel.climatecentral.org/>.

⁴⁵ <http://bit.ly/2qk21gq>.

- Monterey Bay Sea Level Rise Vulnerability Assessment, Technical Methods Report (June 2014).⁴⁶
- Delaware Department of Natural Resources and Environmental Control, Preparing for Tomorrow’s High Tide: Sea Level Rise Vulnerability Assessment for the State of Delaware (July 2012),⁴⁷ and Delaware Department of Natural Resources and Environmental Control, Preparing for Tomorrow’s High Tide: A Mapping Assessment (July 2012).⁴⁸

The following are examples of resources that highlight the ready availability of data on sea level rise and the absurdity of the premise that coastal flood risk projections are more credible if they ignore sea level rise:

- Scott Kulp & Benjamin H. Strauss, *Rapid escalation of coastal flood exposure in US municipalities from sea level rise*, 142 *Climatic Change* 477 (2017);⁴⁹
- Kristina A. Dahl et al., *Sea level rise drives increased tidal flooding frequency at tide gauges along the U.S. East and Gulf Coasts: Projections for 2030 and 2045*, 12 *PLoS ONE* 1 (Feb. 2017);⁵⁰
- Mathew E. Hauer et al., *Millions projected to be at risk from sea-level rise in the continental United States*, 6 *Nature Climate Change* 691 (July 2016).⁵¹

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We appreciate this opportunity to comment on the NFIP draft DNPEIS. Please do not hesitate to contact us with any questions about our observations and recommendations.

Sincerely,



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⁴⁶ <https://perma.cc/29LS-FRQM>.

⁴⁷ <https://perma.cc/A5SJ-DTGH>.

⁴⁸ <https://perma.cc/5ENU-AUP9>.

⁴⁹ <https://perma.cc/8AX8-S3RD>.

⁵⁰ <https://perma.cc/TJS4-JY3E>.

⁵¹ <https://perma.cc/2DBQ-5L9M>.