Marsh McLennan Flood Risk Index

Overview And Structure

[`cVU¨cj Yfj]Yk ˙cZ˙ ccX˙f]g_˙Uh¨h\ Y˙bQ   Y˙b

Selection Criteria

Exhibit 1: Index components, indicators, and data sources

Index component	Indicator	Data sources
	fl i j]U˙Ł \UnUfX	%\$\$!mYUf˙fYh˙fb˙dYf]cX˙\UnUfX˙a˙Udg˙Zfca ˙h˙Y˙K˙cf˙X˙FYgci˙fW˙g˙÷bgh]h˙h˙Y˙fK˙F±Łg˙5ei˙YXi˙Wh˙:˙ccXg˙k˙\]W˙]bWtfdcfUhY˙]bZcfa˙Uh]cb˙Zfca˙)˙7A˙÷D)˙a˙cXY˙g˙f˙l˙:˙8@˙9GA˙&A˙ž˙<UX;˙9A˙&!Ygž÷DG@˙7A˙)˙5!@FžA˙÷F˙C˙7!9GA˙!7<˙9A˙žBcf9GA˙%A˙Łi˙bXYf˙Ub˙F˙7D,˙")˙ŻcfW�]b[˙gW˙bUf]c˙Żcf˙X]˙YfYbhh]a˙Y˙\cf]ncbg˙&\$%\$ž\$'˙\$ž&\$)˙\$ž&\$,˙\$"˙:i˙fh˙Yf˙XYHU]˙g˙WUb˙VY˙Zci˙bX˙]b˙h˙Y˙K˙F˙=5ei˙YXi˙Wh˙:˙ccXg˙a˙Yh˙cXc˙c[˙mXcW˙a˙YbH[3]
	7cUghU˙\UnUfX	%\$\$!mYUf˙fYh˙fb˙dYf]cX˙\UnUfX˙a˙Udg˙Zfca˙K˙F˙=5ei˙YXi˙Wh˙:˙ccXg˙]bWtfdcfUhY˙]bZcfa˙Uh]cb˙Zfca˙h˙Y;˙`cVU˙˙H]XY˙UbX˙Gi˙f[˙Y˙FYUbU˙mg]g˙f˙HGFŁ˙XUHUgYh˙UbX˙a˙cXY˙Żi˙hi˙fY˙WcUghU˙gi˙Vg]XYbW˙"˙:i˙fh˙Yf˙XYHU]˙g˙WUb˙VY˙Zci˙bX˙]b˙h˙Y˙K˙F˙=5ei˙YXi˙Wh˙:˙ccXg˙a˙Yh˙\$Y˙W˙˙hX

XcW a YbH' H\ Y %$$!mYUf fYh fb dYf]cX a Udg Zcf
fU]bZU`` ccX]b[k YfY WU W `UhYX VmdYfZcfa]b[Ub
Yl hfYa Y jU`i Y UbU`mg]gcZh\ Y Ubbi U`a Ul ]a i a jU`i Yg
cZXU`mdfYW]d]hUh]cb Zfca a i `h]d`Y cVgYfjUh]cbU ž
fYUbU`mg]g ž UbX W]a UhY a cXY` XUhU gYhg"

h\Y 7`]a XYI `dfc YVWh" H\ Y Y][\hYI hfYa Y fU]bZU] `a Udg Zcf YUVX k Ufa ]b[ gWVbUf]c k YfY h\Yb UjYfU[YX hc dfcXi VW U`a i `h]!a cXY `Ygh]a UhY" H\Y a i `h]!a cXY` Uj YfU[Yg k YfY h\Yb fYgWU`YX `Vma i `h]d`m]b[h\ Ya `Vm h\Y V]Ug WcffYW]cb ZUWcf`a Ud WU`W `UhYX]b dc]bh` `" H\Y UfYU!k Y][\hYX UjYfU[Y jU`i Y `cZ YI hfYa Y fU]bZU]` ]b YUWX `Wci bhfm Zcf YUVX `k Ufa ]b[ gWVbUf]c k Ug h\Yb WU`WU`UhYX"

Point 5. H\Y UfYU!k Y][\hYX UjYfU[Y jU`i Y `cZ YI hfYa Y fU]bZU]` ]b YUVX `Wci bhfmZcf YUVX `k Ufa ]b[ `Yj Y`fUg WU`W `UhYX ]b dc]bhg %UbX (£k Ug a UddYX hc U `fU]bZU]` \UnUfX gWVfY `ffUb[]b[`Zcfa `% hc `% Li g]b[ `h\Y XYW`YYg cZh\Y X]ghf]Vi h]cb cZ h\Y`&$, $ YI hfYa Y fU]bZU]` jU`i Yg Wci bhf]Yg"

Point 6. CVgYfjUh]cbU`žfYUbU`mg]gžUbX a cXY` g]a i `Uh]cb XUhU \UX`Y\ YfYbh fYYg ci h]cbg" DYfZcfa ]b[ h\ Y cdYfUh]cbg XYgWf]VYX ]b dc]bhg %hc `(fYei]fYX `hc fY]bhfdc `UhY XUhU hc h\ Y \][\ghfYgc `i h]cb Ua cb[U`` XUhU gYg fP!C 6Ł"

H\Y hchU`\UfXY gWVfY Zcf YUVX `Wci bhfmk Ug Ygh]a UhYX `VmUjYfU[]b[ h\ Y f]jYf`bYž`W`UghU`žUbX fU]bZU]` \UfX gWVfYg"

Exposure

Background

9I dcgi fY gWVfYg fY `YWh]bZcfa Uh]cb cb h\Y Wca dcbYbhg.

- **Human exposure**žUb Ygh]a UhY cZ h\Y dYfWYbhU[Y cZ dcdi `Uh]cb YI dcgYX hc `ccX]b[ ]b YUVX `Wci bhfm
- **Economic exposure**žUb Ygh]a UhY cZ h\Y dYfWYbhU[Y cZ UggYhg YI dcgYX hc `ccX]b[ ]b Wci bhfm'

9I dcgi fY gWVfYg k YfY WU`W `UhYX Vm]bhYfgYWh]b[dcdi `Uh]cb UbX UggYh]X]ghf]Vi h]cb XUhU k ]h\ U`UmYf cVhU]bYX Vmi d`ca ]b[ h\Y %$$!mYUf fYhi fb dYf]cX [`cVU`] ]bi bXUh]cb a Udg `cf`f]jYfÿdci gh`žUbX fU]bZU]` `ccX]b[`cf YUVX `k Ufa]b[gWVbUf]c" Bc `WUb[Yg ]b h\a Y cZ h\Y dcdi `Uh]cb UbX UggYh]X]ghf]Vi h]cbg k YfY Ugga YX k \ Yb `Ygh]a Uh]b[ YI dcgi fY gWVfYg `cf`Zi hi fY VWYd UhY WVUb[Y gWVbUf]cgžk \ ]g `cb `mbV`fdfcfhUb`cb`]bZcfa Uh]cb `\UfX"

Limitations

H\Y &$`$$&$) žUbX &$`$ $]a Y `\cf]ncbg k YfY Uggi a YX hc `WcffYgdcbX hc `Ž%) ``7žŽ&``7ž Ž' ") ``7 k Ufa]b[`YjY`g VUgYX cb 7A =D) `a i `h]!a cXY` [`cVU`hYa dYfUhi fY dfc YWh]cbgžk ]h\ci h UVWci bh]cb `Zcf`X YfYbh`a UhYfgUbg]h]jYUfcgg h\ Y 7A =D) YbgYa V`Y"

=bZcfa Uh]cb cb ` ccX XYZYbgYgk Ug bch]bW`i XYX]b h\Y UbU`mg]g

8] YfYbhfYgci h]cbg cZh\Y XUhU gYhg i gYX hc Ygh]a UhY fU]bZU]` ccX]b[ a dUWhYX h\Y `fYdfYgYbhUh]cb cZ YI hfYa Yg"

7A =D) `W]a UhY `a cXY`g a Umi bXYfYgh]a UhY cf cjYfgh]a UhY fU]bZU]` `YI hfYa Yg Ygž UbX WcffYWh]cb ZUWcfg k YfY Udd`]YX hc fYXi WY U giVi XW]Ug]X Uggg
6]Ug WcffYWh]cb ZUWcfg UfY Ugg i a YX WcbghUbh]b h]a Y"

Exposure

Background

9I dcgi fY gWVfYg fY `YWh]bZcfa Uh]cb cb h\Y Wca dcbYbhg.

- **Human exposure**žUb Ygh]a UhY cZ h\Y dYfWYbhU[Y cZ dcdi `Uh]cb YI dcgYX hc `ccX]b[ ]b YUVX `Wci bhfm
- **Economic exposure**žUb Ygh]a UhY cZ h\Y dYfWYbhU[Y cZ UggYh]g YI dcgYX hc `ccX]b[ ]b Wci bhfm'

Calculation

Point 1. 5b U[[fY[UhYX %$$!mYUf`\UnUfX a Ud k Ug WfYUhYX Vm Vca V]b]b[ h\ Y f]jYfÿWcUghU`žUbX fU]bZU]` ]bi bXUh]cb a Udg UWfcgg YUVX cZ h\Y W]a UhY gWVbUf]cg"" cf`fU]bZU]`žfYhi fb UdfYfWV}d]hUh]cb YI WYYX ]b[ &$$a a #XUmk Ug i gYX UgUh\fYg\c`X hc]XYbh]Zma UH]fg_` UfUg" H\Y &$`$$&$) žUbX &$`$ $]a Y `\cf]ncbg k YfY Uggi a YX hc `WcffYgdcbX hc `Ž%) ``7žŽ&``7UbX Ž' ") ``7 k Ufa]b[`YjY`g"

Point 2. 5ggYh]jU`i Y XUhU `Zcfa `; 5F` k Ug U[[fY[UhYX hc `U`fUghYf`UmYf`f`%_a `I `%_a Łhc`dfcj]XYU `Wcbh]bi ci g `fYdfYgYbhUh]cb cZ YI dcgi fY"

Point 3. H\Y[`cVU`dcdi `Uh]cb`f]<G@ŁUbX`UggYh]fI 5F`ŁUmYfg k YfY h\Yb `W]ddYX hc h\Y Vci bXUf]Yg cZ h\Y Wca V]bYX %$$!mYUf`f]jYf`bYžVcUghU`žUbX fU]bZU]`]bi bXUh]cb a Udg"

Point 4. 5 ncbU ghUh gh Wg cdYfUhcf k Ug Udd YX hc gi a
h\Y jU i Yg cZ dcdi Uh cb UbX UggYhg b h\Y buXUhYX
UfYUg žh\ i g WU W Uh b[h\Y hchU jU i Yg cZ Yldcgf YX
dcdi Uh cb UbX UggYhg b YUW\ WU i bhfm

Point 5. H\Y gUa Y ncbU ghUh gh Wg cdYfUhcf k Ug
Udd YX hc WU W Uh Y h\Y hchU UggYhg UbX dcdi Uh cb
Wca i bhfm

Point 6. H\Y dYfWYbhU[Yg cZ dYcd Y UbX UggYhg
h fYUhYbYX Vm ccX b [k YfY WU W UhYX Zcf YUW\
Wca i bhfm Vm X j X b[h\Y bia VYfg YghŽa UhYX b dc bhg
) "

Point 7. <i a Ub UbX YWcbca WW Yldcgif Yg gWcf Yg Zcf
YUW\ Wca i bhfm ffUb[b[Zfca %hc %\$ łk YfY gh a UhYX
Zfca h\Y hk c dYfWYbhU[Y jU i Yg Vm Wca dUf b[h\Ya
hc h\Y XYW Yg cZ h\Y WcffYgdcbX b[X gh f Vih cb cZ
dYfWYbhU[Yg UWfcgg Wci i bhf Yg b &\$ \$" GWcf Yg Zcf h\Y
Zci f gWUbUf cg fdfYgYbhXUm ž &' łžž\$) \$ž&\$ \$łk YfY U
Ygh a UhYX i g b[h\Y XYW Yg cZ h\Y &\$ \$ X ghf Vih cbg"

Point 8. HchU Yldcgif Y gWcfYg k YfY WU W UhYX Vm
UjYfU[b[h\Y \i a Ub UbX YWcbca WW Yldcgif Y gWcfYg"

Limitations

H\Y &\$ \$ž&\$ \$ž UbX &\$ \$ h a Y \cf nchbg k YfY
Uggi a YX hc WcffYgdcbX hc Žž%) ž.7žŽž&ž.7ž
Žž") ž.7 k Ufa b[jYjY g UggYX cb 7A =D) a i h !a cXY
[cVU hYa dYfUhi fY dfc YWh cbgžk h i hc hUWWci bh b[
Zcf X YfYbhWa UhY gYbg jh jh Yg UWfcgg h\Y
7A =D) YbgYa V Y"

8i Y hc h\Y X[WW \m b Ygma Uh cb cc X Yldcgif Y ž
h YfY k Ug U a \ YX WXc WW cZ UjU UV Y XUhUgYhg" 8UhU
gci fWYg WXc gYb hc WU W Uh Y Yldcgif Y fdfYf YgYbhVYgh
UjU gg Yb bg XWfcih jc Y k bVhY \m gg Y WWcYYWX Yg gZjU c a Y"

Vulnerability

Background

Ji`bYfUV]`]hm¡gVcfYg¡fY YVh¡gcV]cYVcbca]V
g¡gW dh]V]`]hm¡hc` ccX]b[UbX¡UfY¡VUgYX¡cb¡h\Y¡
]bX]VUhcfg.

- **The Human Development Index (HDI**
  Vidh¡fYg¡h\fYY¡X]a Ybg]cbg¡cZ\i a Ub¡XYjY`cda Ybh¡
  h\UhUfY¡\][\`mfY`YjUbh¡hc¡i a Ubji`bYfUV]`]hm

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24 Details regarding the calculation of HDI can be found

Overlays Statistics Calculation

Background

H\Y`CjYf`Umg`gYWh]cb`cZh\Y`bXYI`g\ck`g`h\Y`[`cVU`
]bi bXUh]cb`a Udg`Zcf`f]jYf]bY`UbX`WUghU`ccX]b[`
f%\$\$!mYUf`fYhi fb`dYf]cX`a Udg`Zfca `K F=g`5ei YXi Wh
: `ccXgh`žUbX`h\Y`fU]bZU``]bi bXUh]cb`a Udg`[YbYfUhYX`
h\fci [\`Zfca `h\Y`dfcWWgg`XYgW]VYX`]b`h\Y`<UnUfX`
7U`W`Uh]cb`gYWh]cb`cZh\]g`XcWa Ybh"H\Y`CjYf`Umg`
gYWh]cb`U`gc`dfYgYbhg`XUhU`cb`h\Y`[`cVU`X]ghf]Vih]cbg`
cZi fVUb`UfYUg`žfi fU`UfYUg`žUbX`W]h]WU`]bfUghfi Whi fY`
UggYhgžUWW`a dUb]YX`Vm`_Ym`Wci bhfm`YjY`ghUh]gh]Wg.

- **Urban Areas**žk]h\`h\Y`dYfWbhU[Y`cZi fVUb`UfYUg`
  Uh`f]g_`cZ`ccX]b["
- **Rural Areas**žk]h\`h\Y`dYfWbhU[Y`cZfi fU`UfYUg`Uh`
  ccX]b["
- **Power Plants**žk]h\`h\Y`dYfWbhU[Y`cZdck Yf`
  [YbYfUh]cb`WUdUW]hmUh`f]g_`cZ`ccX]b["
- **Ports and Airports**žk]h\`h\Y`dYfWbhU[Yg`
  cZ]bhYfbUh]cbU``hfUXY`jc`i a Yg`fdcfhgË`UbX`
  ]bhYfbUh]cbU``gYUhgfU]fdcfhgËUh`f]g_`cZ`ccX]b["

Calculation

Point 1. 5b`U[[fY[UhYX`%\$\$!mYUf`\UnUfX`a Ud`k Ug`
WfYUhYX`Vm`Wta V]b]b[`h\Y`f]jYf]bYžWtUghU`žUbX`fU]bZU``
]bi bXUh]cb`a Udg`UWfcgg`YUW`cZh\Y`W]a UhY`gWYbUf]cg"`
: cf`fU]bZU``žYUi hfYa Y`dfYW]d]hUh]cb`YjYYXg`% &\$\$a a #
XUmk Ug`i gYX`Ug`U`h\fYg\c`X`hc`]XYbh]Zmi Uh`f]g_`UfYUg"`
H\YgY`a Udg`k YfY`]bhYfgYWhYX`k]h\`K cf`X`6Ub_`
Vci bXUfmXUhU`UbX`h\Y`XUhU`gYhg`]ghYX`]b`dc]bhg`&`hc`(`
hc`Ygh]a UhY`h\Y`dfYWbhU[Yg`cZ`\$\$!mYUf`]   Ub Vf   :   Zi fVUV   U   U

V   Z   \g`X`hc   Y
          \$ g`cZ

Acknowledgments

Authors

Gk Yb'U'Gi fa]bg_]žA UbU[ ]b['8]fYWhcfž7'}a UhY'FYg]`}YbWYžA Ufg\'A W@YbbUb 5XjUbhU[Y

7'Ui X]c'GU ch]žFYgYUfWX'A UbU[YfžA Ufg\'A W@YbbUb 5XjUbhU[Y

GUbXfU'8i YbUgžGYb]cf'8UhU'GW]Ybh]ghž

Hcg\]b'GYei Y]fUžFYgYUfWX'5bU`mghžA Ufg\'A W@YbbUb 5XjUbhU[Y

5X]h]? ch\Uf]žFYgYUfWX'5bU`mghžA Ufg\'A W@YbbUb 5XjUbhU[Y

Gi a Yf'8fU``žFYgYUfWX'5bU`mghžA Ufg\'A W@YbbUb 5XjUbhU[Y

Contributors

F]W.UfX'Ga]h\!6]b[\Ua ž9lYWh]jY'8]fYWhcfžA Ufg\'A W@YbbUb 5XjUbhU[Y

6`U]f'7\U'a YfgžA UbU[ ]b['8]fYWhcfž÷bbcjUh]cbg]b'÷b÷bžfUghfiWhi fYžA Ufg\'A W@YbbUb 5XjUbhU[Y

?Uj]h\U'<Uf]\UfUbbž8]fYWhcfž<YU'h\miGcVW]Yh]YgžA Ufg\'A W@YbbUb 5XjUbhU[Y

6Yb`<cgh\Yfž8]fYWhcfžHfUbgzcfa Uh]jY'HYWWXbc`c[]YgžA Ufg\'A W@YbbUb 5XjUbhU[Y

8Ub]Y`'?Ub]Yk g_]žA UbU[ ]b['8]fYWhcfžDi V']WGYWhcfžA Ufg\'A W@YbbUb 5XjUbhU[Y

7'U]f'C`gcbžA UbU[ ]b['8]fYWhcfžA Ufg\'A W@YbbUb 5XjUbhU[Y

:fUbW]g'6ci W.UfXžA UbU[ ]b['8]fYWhcfžA Ufg\'A W@YbbUb 5XjUbhU[Y

@i WmiB]chh]b[\Ua ž8]fYWhcfžGhfUhY[][WDUfhbYfg\]dgžA Ufg\'A W@YbbUb 5XjUbhU[Y

GmXbYYm< YXVYf[ž8]fYWhcfž; `cVU`'7cfdcfUhY'GhfUhY[mžA Ufg\'A W@YbbUb 5XjUbhU[Y

A Uhh\Yk '9U['Yžž<YUX'cZž `cVU`'A cXY`'Gc`i h]cbgUbX'5X]g]cfmž im7UfdYbhYf

A Uf_'K YUh\Yf\YUXžA UbU[ ]b['8]fYWhcfž<YUX'cZž7UhUghfcd\Y'5X]g]cfmžG95?-žž im7UfdYbhYf

A]WUY'Ck YbžA UbU[ ]b['8]fYWhcfž im7UfdYbhYf

>Ygg]WU'H fbYfžA UbU[ ]b['8]fYWhcfž7UhUghfcd\Y'5X]g]cfmž im7UfdYbhYf

8Ui X'W'UfWc'Yž8]fYWhcfž8YjY`cda Ybh'GW]Ybh]ghž im7UfdYbhYf

xcgYd\': '6YW_YfžF/ 8#5XjUbhcfmGYb]cf'7UhUghfcd\Y'5X]g]cfYž im7UfdYbhYf

>YfYa mK U]hYžGYb]cf'J]WY'DfYg]XYbhž6fc_]b[ž im7UfdYbhYf

5a m6UfbYgž<YUX'cZ7`a UhY'UbX'Gi ghU]bUV]`]hmiGfUhY[][mž

; Ycf[Y'G'"6U'Xk]bž7cbgi `hUbhž'8]fYWhcf/ '7c!'YUXYf'cZ7`a UhY'FYg]`}YbWYž

6Yj]Yf'Ym5XUa gž<YUX'cZJ]gi U`'÷bhY'`][YbWYWUbX'75H'D'Ubb]b[ž

B]W.c`Ug': Ui '`ž<YUX'cZ7`a UhY'UbX'Gi ghU]bUV]`]hmiF]g_ ž

8Uj]X'?'Y`?'mžGYb]cf'A UbU[Ya Ybh'7cbgi 'hUbhž9G; ž

; fUYa Y'F]XXYf'ž7`a UhY'UbX'Gi ghU]bUV]`]hmi7cbgi `h]b[]b['@YUXYfž

5   b

6Y'b[[*   ž<U   }`   Q

; fU'V Y'F   °   ] S   °   ]b   % ˝ c   h U˙ U