RMAT气候复原力设计标准工具

概览

2024年6月

Executive Office of Energy and Environmental Affairs

ResilientMass
Climate Adaption Clearinghouse for the Commonwealth

工具目标：

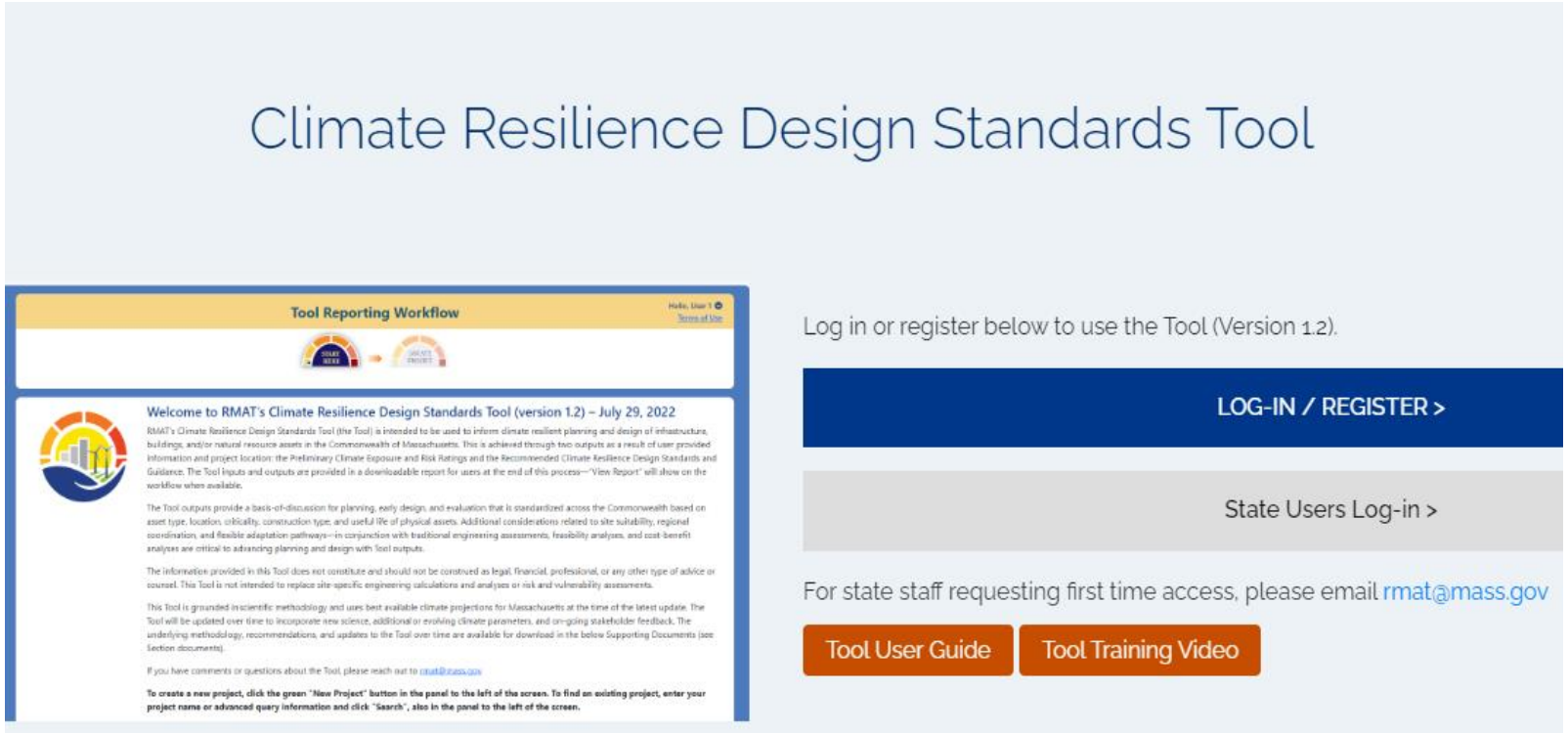
- 使初步的气候复原力分析**更广泛地被接受**
- 为"**气候智能**"的资本规划、项目设计和采购提供信息
- 根据对州气候数据的**一致使用**提供建议
- 提供一个州政府部门可以用来管理补助计划的统一规划和设计**支持工具**
- 在resilient.mass.gov上为市政府提供**一致的信息**

https://resilient.mass.gov/

什么时候使用此工具：

该工具的输出为规划、早期设计和评估提供了一个标准化的讨论基础。这个基础在整个联邦州范围内都被标准化，它是以资产类型、位置、重要性、建筑类型和物理资产的使用寿命为基础的。

- **项目规划，设计和采购**
- 项目选址
- 改进州级的补助申请



https://resilient.mass.gov/rmat_home/designstandards/

关键可用的资源：

Log in or register below to use the Tool (Version 1.2).

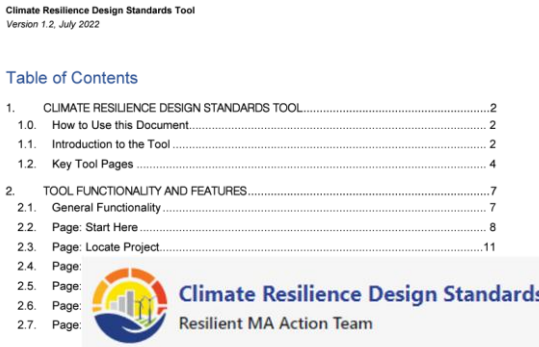
LOG-IN / REGISTER >

State Users Log-in >

For state staff requesting first time access, please email rmat@mass.gov

Tool User Guide | Tool Training Video

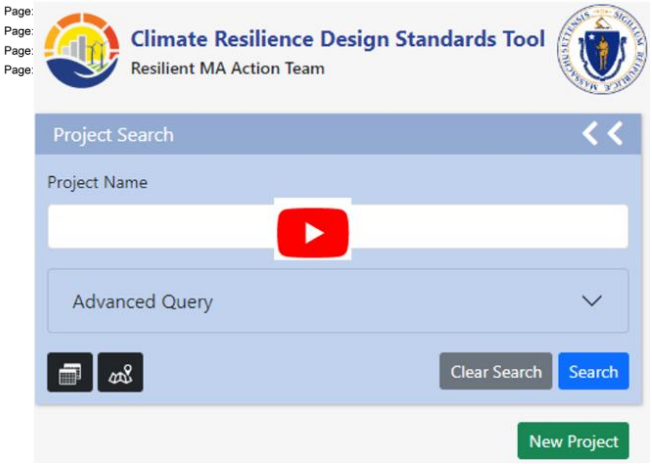
用户指南



Climate Resilience Design Standards Tool
Version 1.2, July 2022

Table of Contents

培训视频



Tool (V1.2) Training Video - February, 2023

Guidance and Best Practices

The Climate Resilience Design Guidance provides general design guidance to consider while implementing resilience principles that are not specific to project type or climate hazards, and are illustrated through exam the Guidance considerations and document decision making throughout the planning process.

Guidance and Best Practices PDF

Additional forms include:

- Site Suitability
- Regional Coordination
- Flexible Adaptation Pathways

气候复原力设计指南以及最佳做法

Table 1.1. Climate Resilience Design Guidance Best Practices

Considerations	Best Practice
Site Suitability (SS)	1. Reduce exposure to climate hazards 2. Mitigate adverse climate impacts and provide benefits 3. Protect, conserve, and restore critical natural resources on-site and off-site
Regional Coordination (RC)	1. Assess regional context of vulnerability 2. Evaluate impacts beyond site-specific design 3. Optimize capital investment opportunities 4. Prioritize services and assets that serve vulnerable populations
Flexible Adaptation Pathways (AP)	1. Embed future capacity and design for uncertainty 2. Design for incremental change 3. Encourage climate mitigation and other co-benefits 4. Prioritize nature-based solutions 5. Prepare for current and future operational and maintenance needs

相关文档以及技术数据相关输入：

- Massachusetts Coast Flood Risk Model (MC-FRM) FAQ (April 6, 2022)
- Massachusetts Coast Flood Riks Model (MC-FRM) Online Trainings (April-May 2023)
- EEA's Climate and Hydrologic Risk Project - Weather Generator Technical Document (April, 2022)
- EEA's Climate and Hydrologic Risk Project - IDF Curves Technical Document (December, 2021)

https://resilient.mass.gov/rmat_home/designstandards/

开始

点击此网址登录:
https://resilient.mass.gov/rmat_home/designstandards/

外部用户必须遵循注册向导以获取首次访问权限

州用户应在rmat@mass.gov处请求首次访问权限

*使用**@dot.state.ma.us**电子邮件地址的新工具帐户需要额外的准备时间

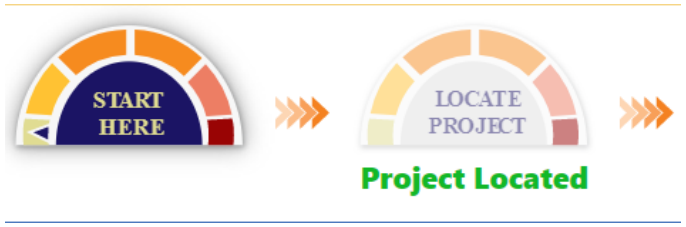
搜索已建的项目,

或者

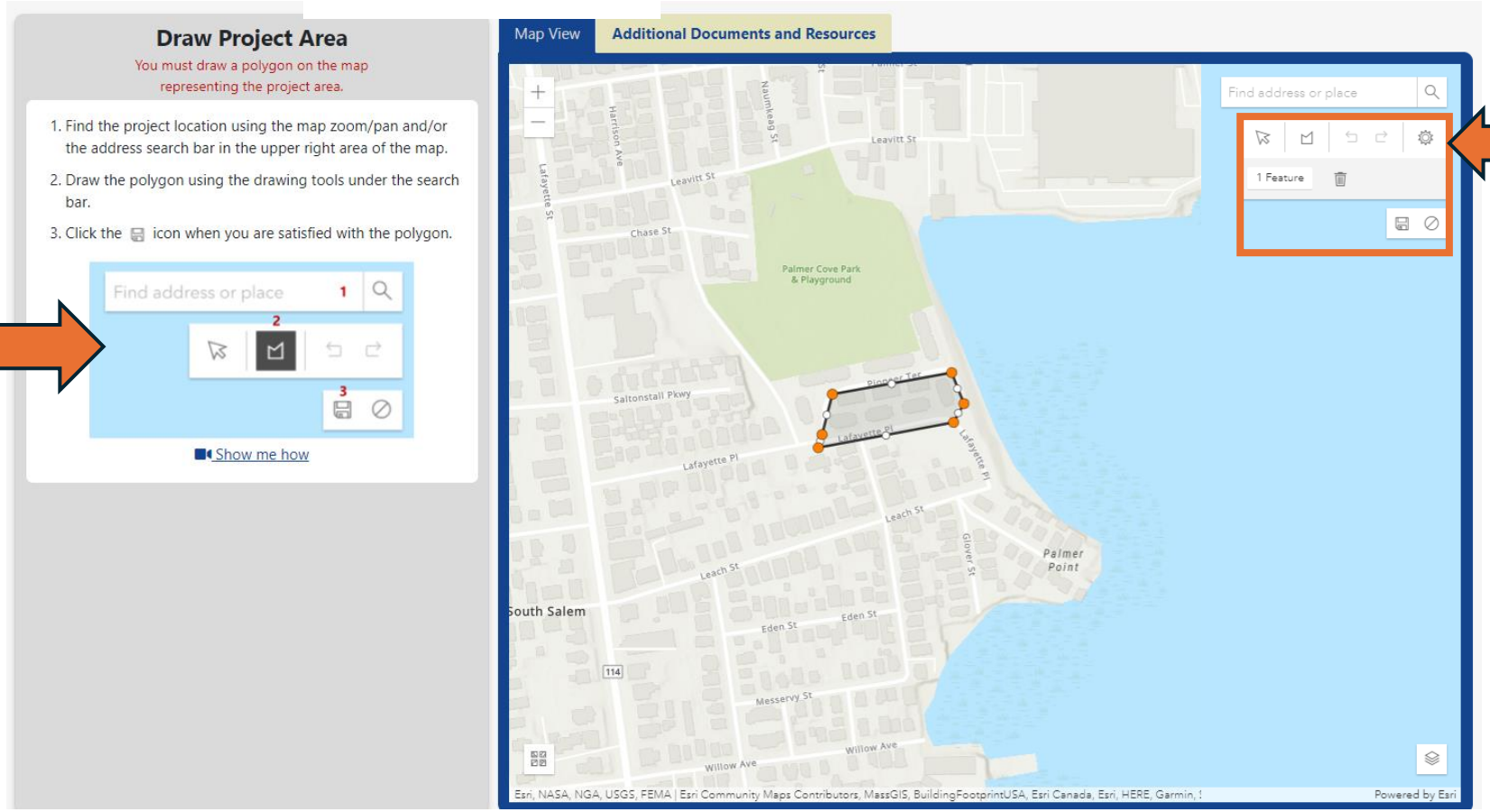
点击 **“New Project”** 以开始

项目输入

工具报告相关工作流程



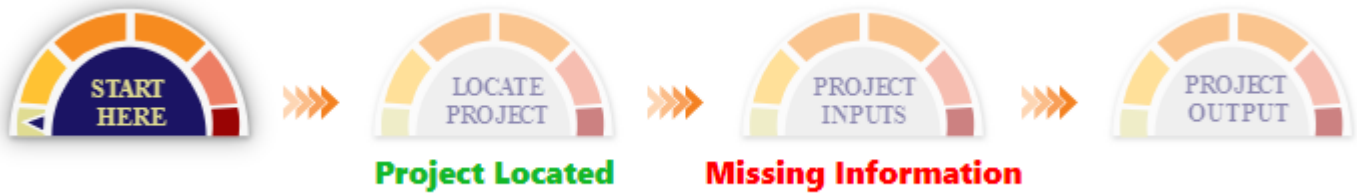
画下关于项目的足迹

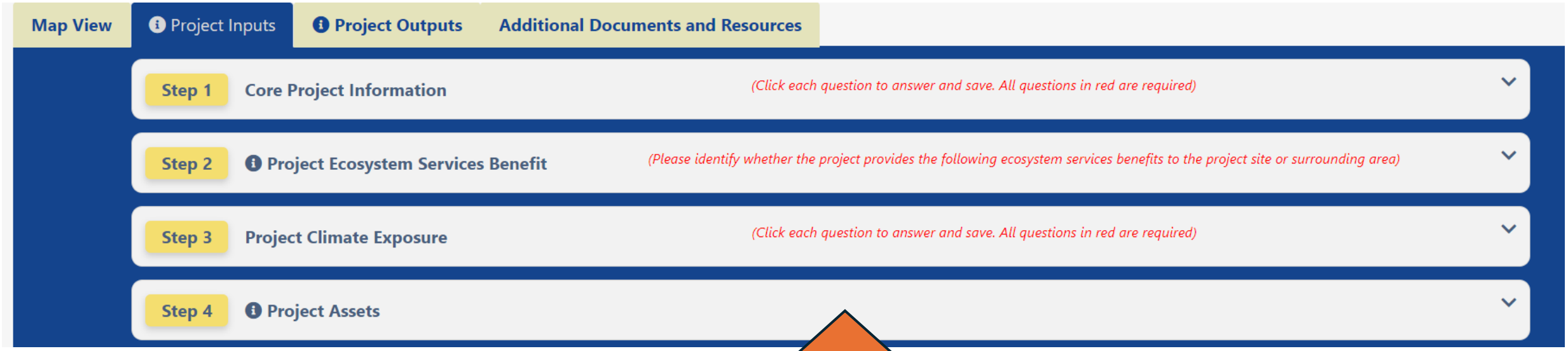


画画工具

项目输入

工具报告相关工作流程





请回答四个步骤的输入问题：

1. 背景信息
2. 项目的环境受益
3. 危害暴露历史
4. 资产具体信息

项目输入

工具报告相关工作流程

输入完成后工作流程就会有所扩展

Step 2 Project Ecosystem Services Benefit

第二步:
项目的环境受益

Provides flood protection through green infrastructure or nature-based solutions	No
Provides storm damage mitigation	No
Provides groundwater recharge	No
Protects public water supply	No
Filters stormwater	No
Improves water quality	No
Promotes decarbonization	Yes
Enables carbon sequestration	Yes
Provides oxygen production	No
Improves air quality	No
Prevents pollution	Yes
Remediates existing sources of pollution	No
Protects fisheries, wildlife, and plant habitat	No
Protects land containing shellfish	No
Provides pollination	No
Provides recreation	No

指南 (i)

Step 3 Project Climate Exposure

第三步:
危害暴露历史

Does the project site have a history of coastal flooding?	Yes
Does the project site have a history of flooding during extreme precipitation events (unrelated to water/sewer damages)?	No
Does the project result in a net increase in impervious area of the site?	No
Does the project site have a history of riverine flooding?	No
Are existing trees being removed as part of the proposed project?	No

Step 4 Project Assets

第四步：资产具体信息

Building/Facility Add

UserGuide Building

Infrastructure Add

N/A

Natural Resources Add

N/A

Selected Asset:	UserGuide Building
Asset Type:	Typically Occupied
Asset Sub-Type:	Residential building - Public Housing
Construction Type:	Maintenance (critical repair)
Construction Year:	2025
Useful Life:	15

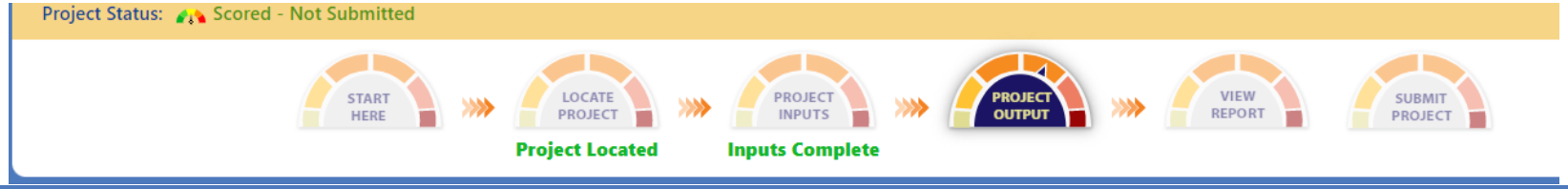
Identify the length of time the asset can be inaccessible/inoperable without significant consequences.	Building must be accessible/operable at all times, even during natural hazard event
Identify the geographic area directly affected by permanent loss or significant inoperability of the building/facility.	Impacts would be limited to local area and/or municipality
Identify the population directly served that would be affected by the permanent loss of use or inoperability of	Less than 1,000 people

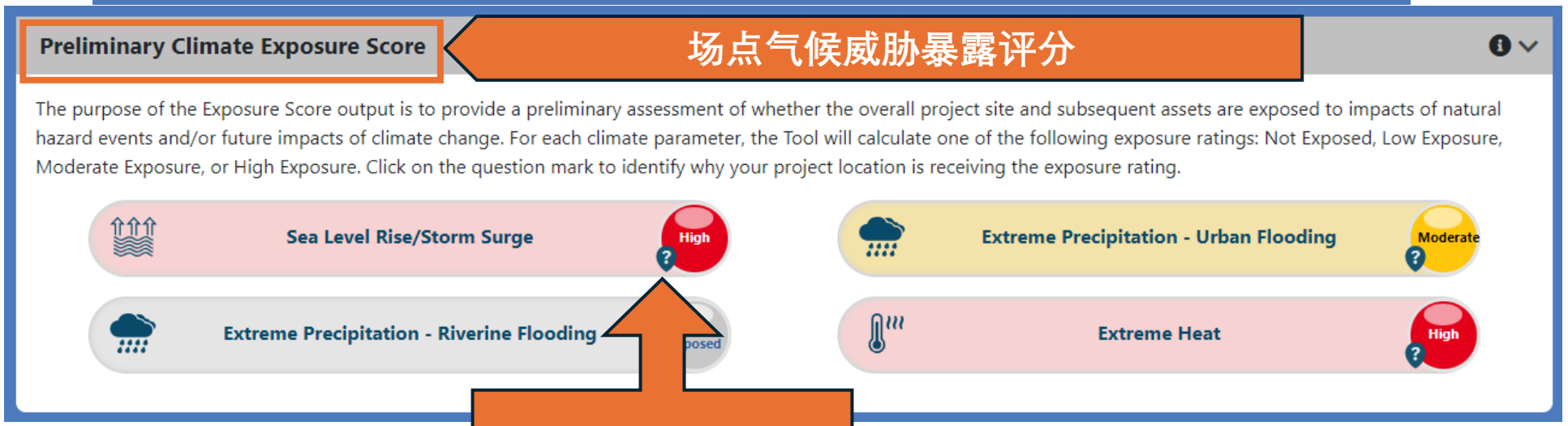
输出：项目级别分数

工具报告相关工作流程

输出：项目级别分数

工具报告相关工作流程

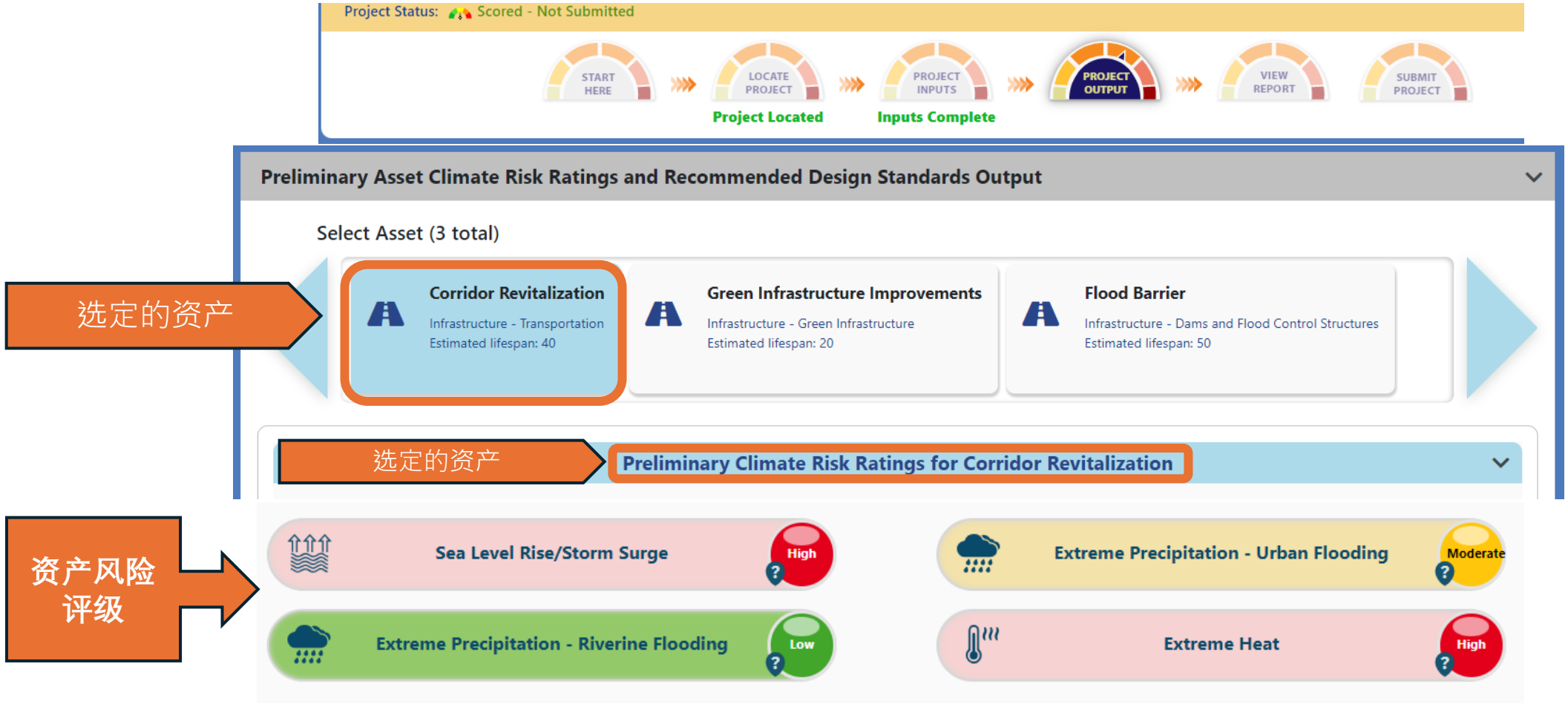




还提供更多的详细信息：

输出：资产气候风险评级

工具报告相关工作流程

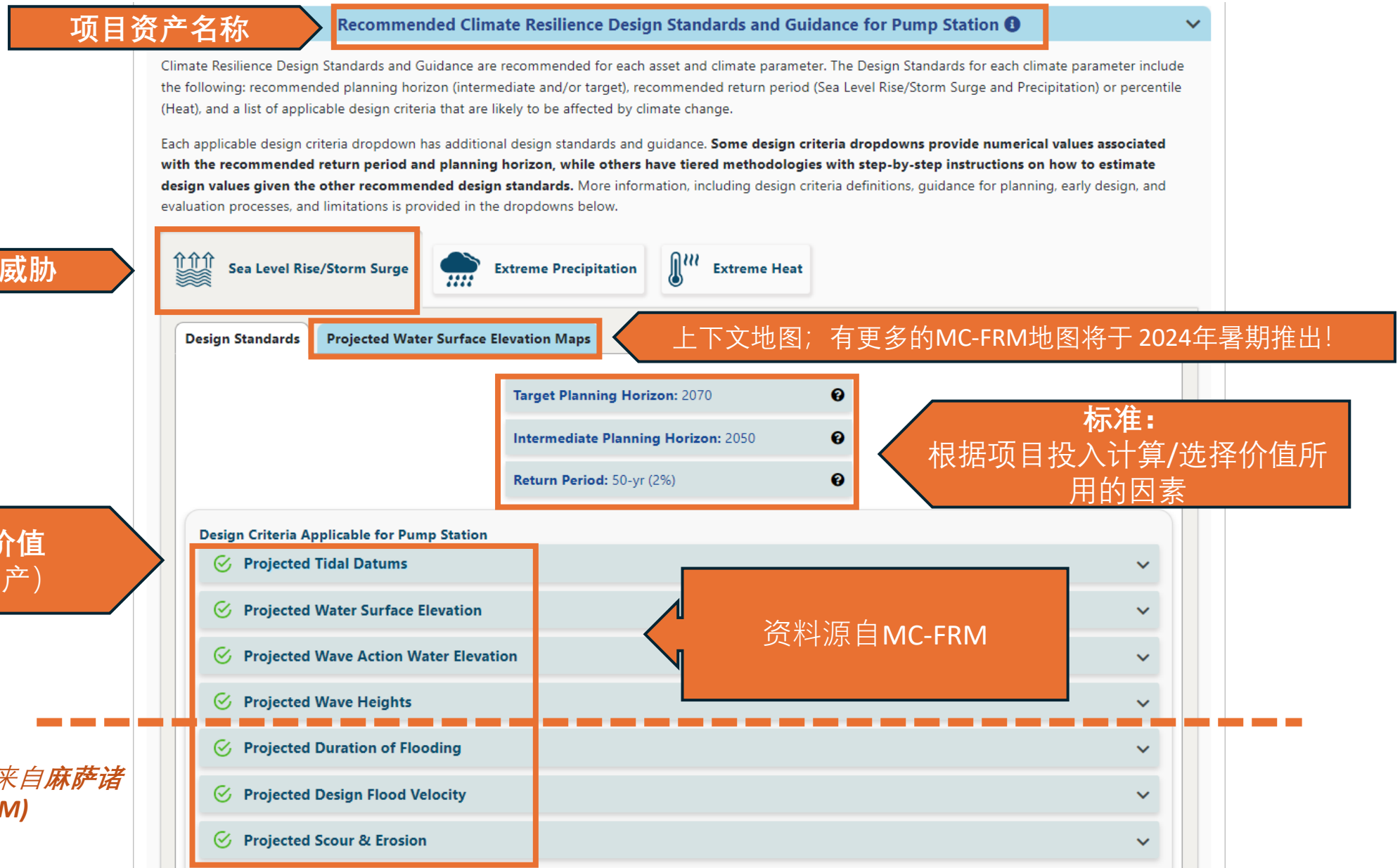


工具项目可以适用于多项资产

*将获得**每项**输入**资产**的**气候风险**评级*

请注意：尽管由于地理位置因素，可能会得到“海平面上升/风暴潮”或“极端降水 - 河流洪水”**项目**的“无暴露”项目分数，但该工具仍会给出一个**资产风险分数**（低）。

输出：标准/设计准则（沿海洪水）



*大多数沿海设计标准预测值均来自**麻萨诸塞州海岸水淹风险模型(MC-FRM)***

输出：设计价值指南（沿海水淹）

Design Criteria Applicable for Pump Station

- **Projected Tidal Datums**
- **Projected Water Surface Elevation** ← 设计标准名称/价值

Definition

Projected Water Surface Elevation is the projected elevation for a specific future flood event, considering storm surge, tides, and wave setup. Wave setup, as included in water surface elevation, is defined by FEMA as "an increase in the total stillwater elevation against a barrier (dunes, bluffs, or structures) caused by breaking waves." (https://www.fema.gov/sites/default/files/2020-02/Coastal_Wave_Setup_Guidance_Nov_2015.pdf).

Projected Water Surface Elevation Values: ← 价值解释

The projected modeled elevations may vary across large sites due to variations in the site's physi
presented as a maximum, minimum, and area weighted average values in the table below. The a
value corresponding to the projected Water Surface Elevation of the project site.

选定资产的价值

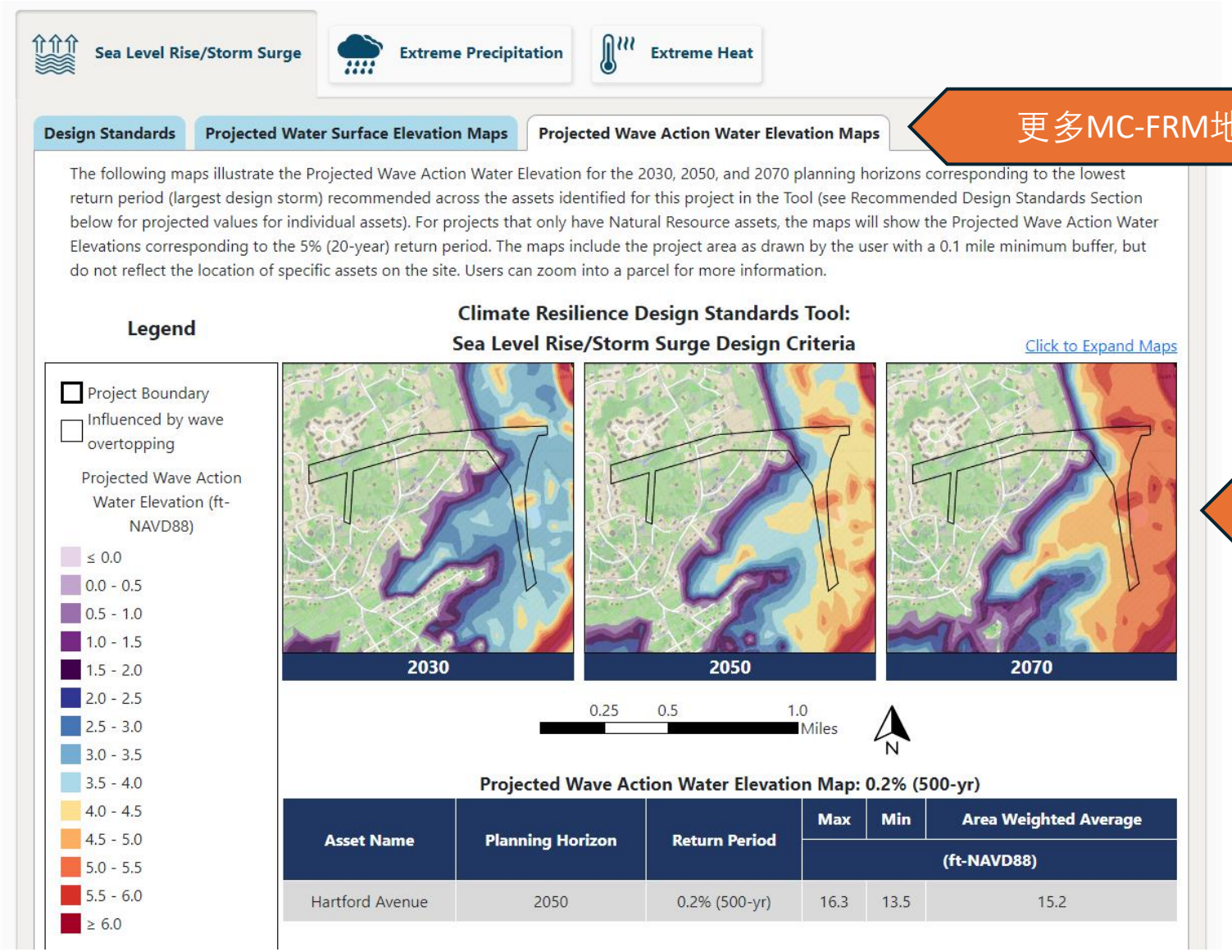
Asset Name	Recommended Planning Horizon	Recommended Return Period	Max (ft - NAVD88)	Min (ft - NAVD88)	Area Weighted Average (ft - NAVD88)
Pump Station	2050	2% (50-Year)	12.1	12.0	12.0
	2070		13.9	13.8	13.8

- **How Water Surface Elevation may inform Planning**
- **How Water Surface Elevation may inform Early Design**
- **How Water Surface Elevation may inform Project Evaluation**

关于如何在规划、早期设计和项目评估（例如MEPA）期间使用价值的指南

- **Limitations for Projected Water Surface Elevation Values, Standards, and Guidance**

输出：沿海水淹地图



Asset Name	Planning Horizon	Return Period	Max	Min	Area Weighted Average
			(ft-NAVD88)		
Hartford Avenue	2050	0.2% (500-yr)	16.3	13.5	15.2

更多MC-FRM地图将于2024年暑期推出！

项目场点视野有限，无法预见沿海水淹情况

*大多数沿海设计标准预测值均来自**麻萨诸塞州海岸水淹风险模型 (MC-FRM)***

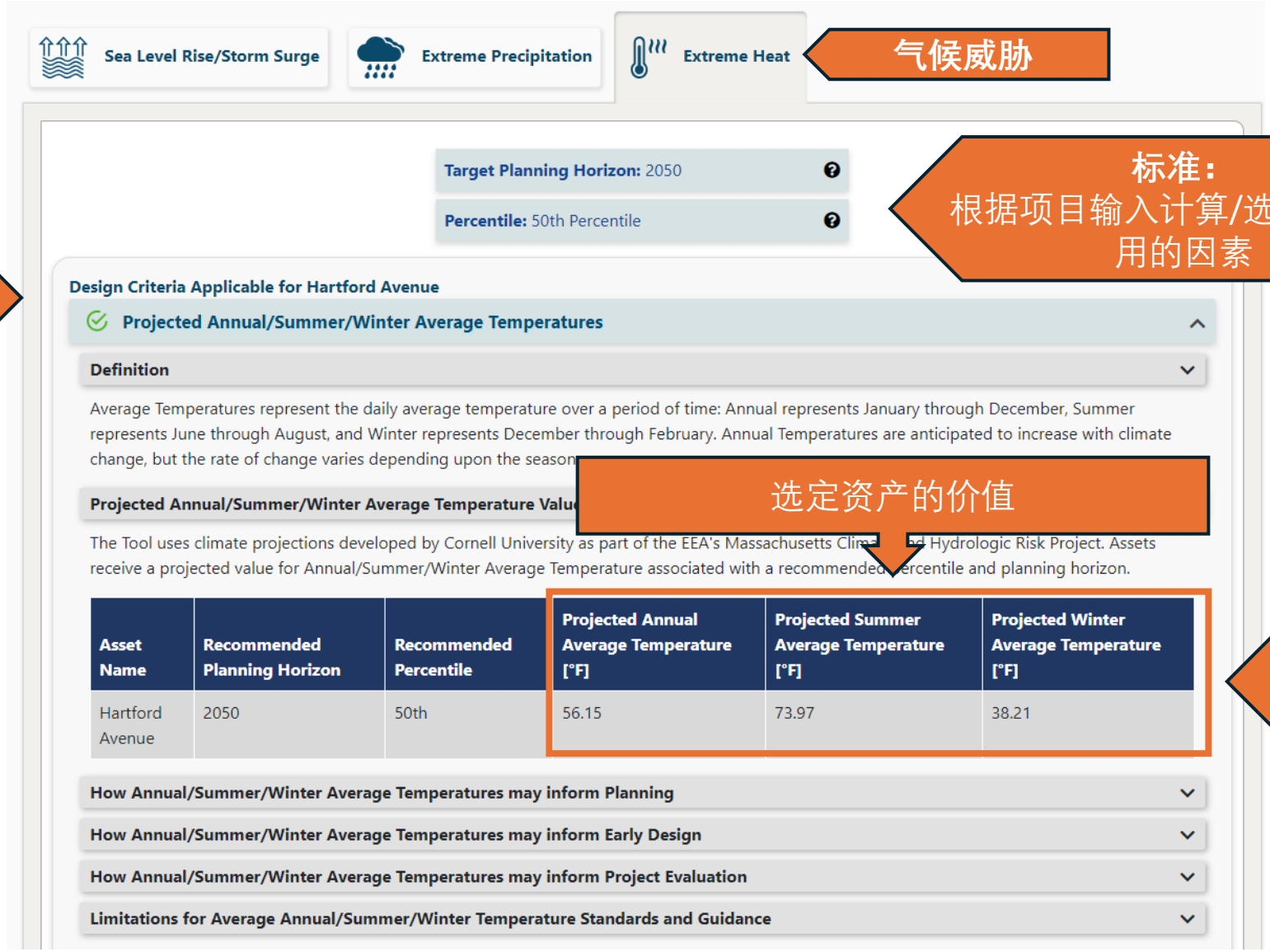
输出：标准/设计准则（降水量）

*将收到针对**每项资产**的推荐标准和设计准则*

*在外部控制页面上**查找其他设计风暴降水值：***

https://mass-eoeea.maps.arcgis.com/apps/dashboards/2e8534bc2a7849b0aa6f64d0f79a8937

输出：标准/设计准则（温度）


Sea Level Rise/Storm Surge
Extreme Precipitation
Extreme Heat
气候威胁
Target Planning Horizon: 2050
Percentile: 50th Percentile
标准：
根据项目输入计算/选择价值所用的因素
设计标准和价值
（针对选定资产）
Design Criteria Applicable for Hartford Avenue
Projected Annual/Summer/Winter Average Temperatures
Definition
Average Temperatures represent the daily average temperature over a period of time: Annual represents January through December, Summer represents June through August, and Winter represents December through February. Annual Temperatures are anticipated to increase with climate change, but the rate of change varies depending upon the season
选定资产的价值
Projected Annual/Summer/Winter Average Temperature Valu
The Tool uses climate projections developed by Cornell University as part of the EEA's Massachusetts Clim Hydrologic Risk Project. Assets receive a projected value for Annual/Summer/Winter Average Temperature associated with a recommended ercentile and planning horizon.
Asset Name
Recommended Planning Horizon
Recommended Percentile
Projected Annual Average Temperature [°F]
Projected Summer Average Temperature [°F]
Projected Winter Average Temperature [°F]
Hartford Avenue
2050
50th
56.15
73.97
38.21
2024年暑期即将推出新外观/功能！
How Annual/Summer/Winter Average Temperatures may inform Planning
How Annual/Summer/Winter Average Temperatures may inform Early Design
How Annual/Summer/Winter Average Temperatures may inform Project Evaluation
Limitations for Average Annual/Summer/Winter Temperature Standards and Guidance

下载项目报告

在**查看报告**的工作流页面上预览报告摘要。

下载项目报告的**PDF**。点击“**Submit**”以提交报告。

将PDF**上传/附加(Upload/attach)**到相应的授权门户/MEPA文件。

完整的项目场点暴露评分

Ecosystem Service Benefits	Scores
Project Score	Moderate
Exposure	**Scores**
Sea Level Rise/Storm Surge	High Exposure
Extreme Precipitation - Urban Flooding	High Exposure
Extreme Precipitation - Riverine Flooding	Not Exposed
Extreme Heat	High Exposure

资产风险评级(针对每项资产)

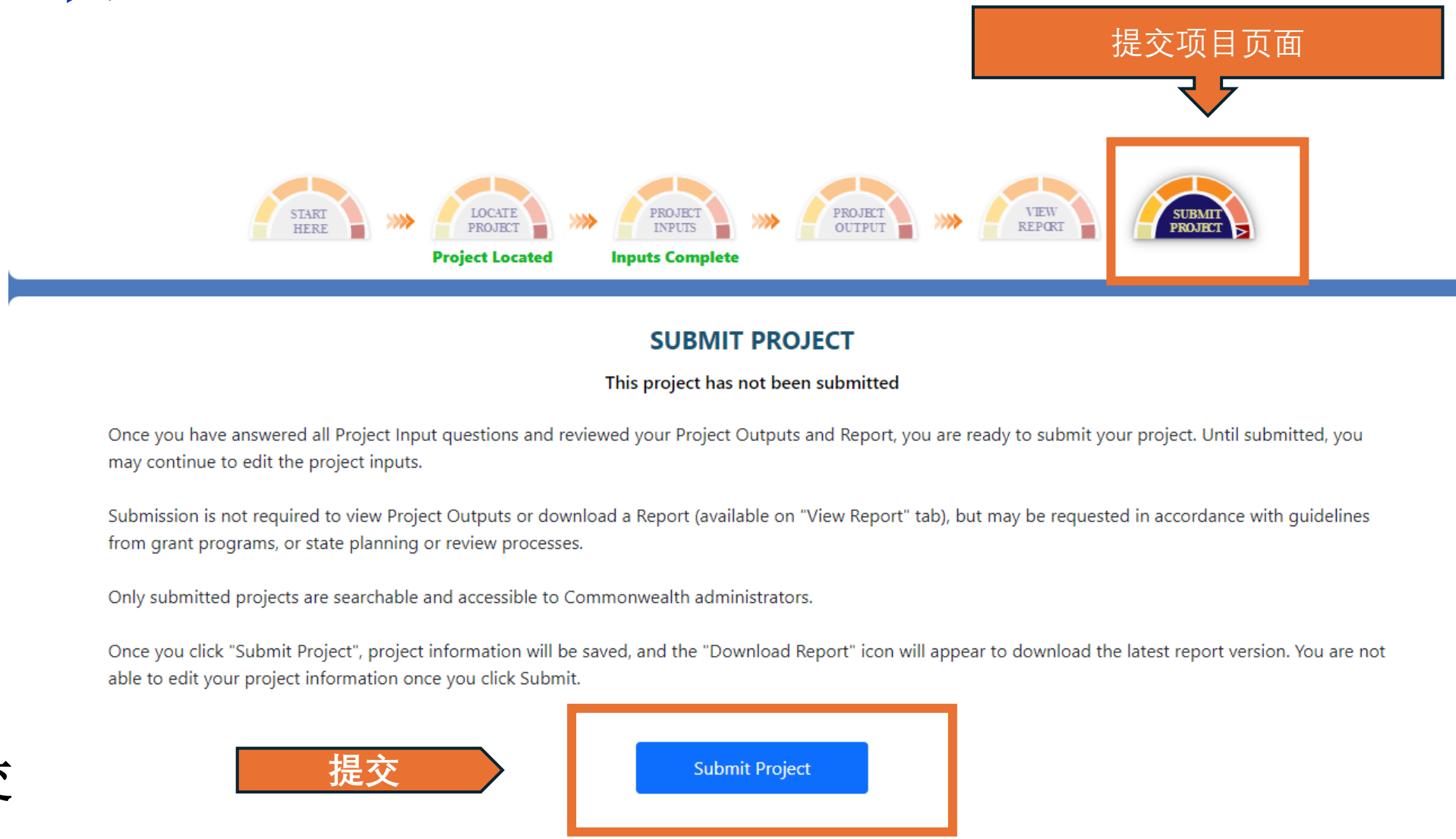
Asset Preliminary Climate Risk Rating

Number of Assets: 3

Summary

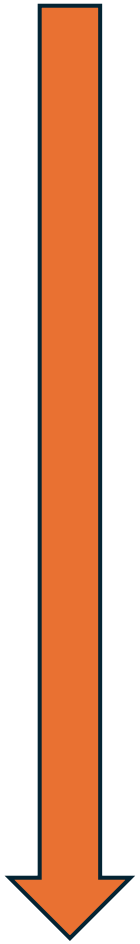
Asset Risk	Sea Level Rise/Storm Surge	Extreme Precipitation - Urban Flooding	Extreme Precipitation - Riverine Flooding	Extreme Heat
Agawam Asset A	High Risk	High Risk	Low Risk	High Risk
Cranberr Asset B	High Risk	High Risk	Low Risk	High Risk
Agawam River Asset C	—— Natural Resource project assets do not receive a preliminary climate risk rating. ——			

提交项目报告



点击 **“Submit” 提交报告**

工具版本相关历史



Beta工具（2021年4月）

- MVP 和 Massworks 要求在资助申请中提供工具报告

版本1.0（2022年2月）

- 气候暴露相关最新消息
- 生态系统服务利益相关最新消息
- 增加工具内引导

版本1.1（2022年4月）

- **MC-FRM 二级输出**（适用于沿海设计标准的动态表格）
- 麻州气候水文风险项目输出（适用于极端降水设计标准的动态表格）

版本1.2（2022年7月）

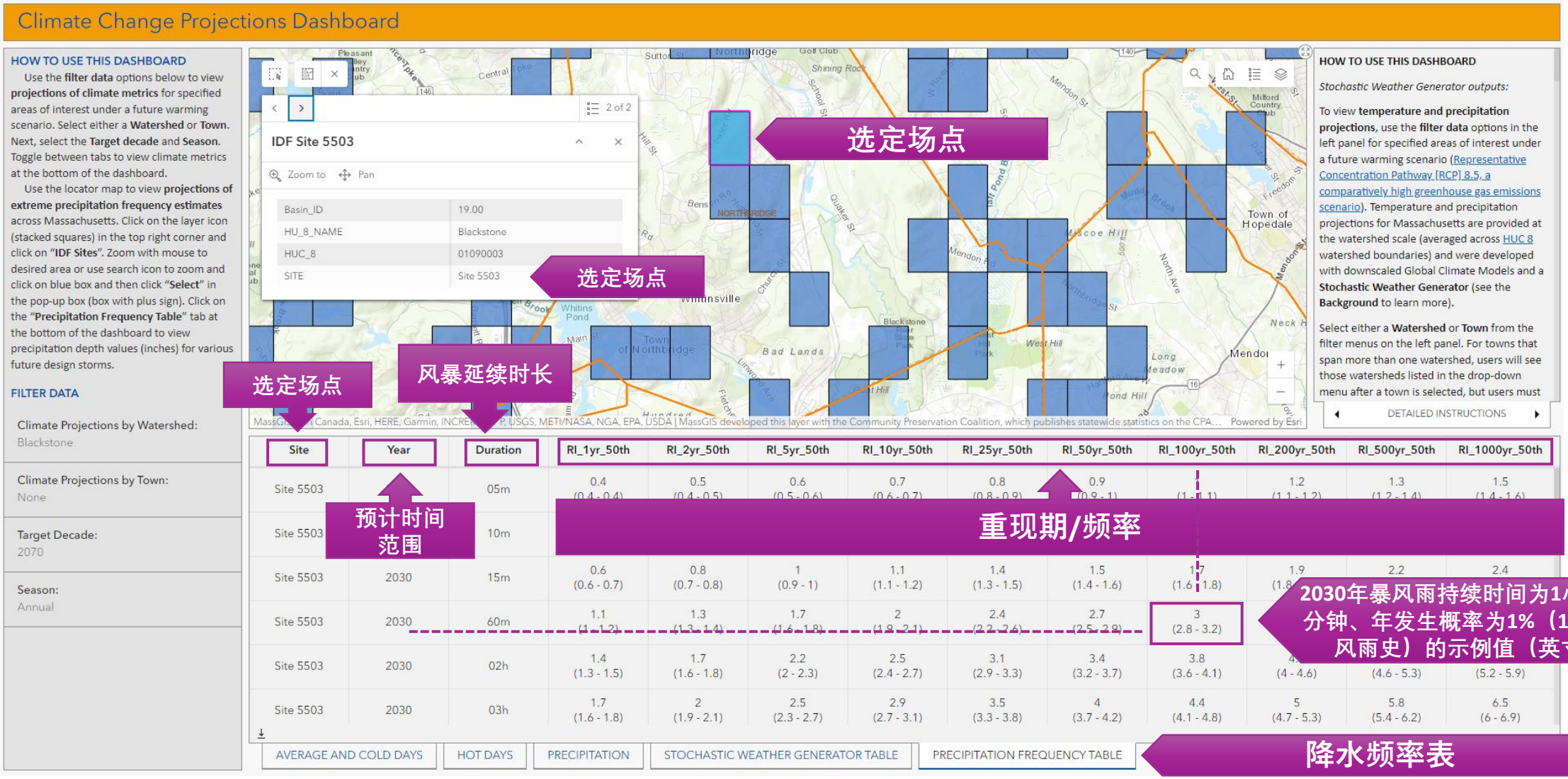
- **MC-FRM预计水面高度地图**（工具内接口交互以及项目报告中的打印版地图）

版本1.3（2024年）- 进行中

- 更新温度设计标准（**将预计值添加到工具接口中**）
- 增加MC-FRM地图（**预计波动水位高度**）
- 错误修复

相关资源:

气候获悉降水值（强度–持续时间–频率）



https://mass-eoeea.maps.arcgis.com/apps/dashboards/2e8534bc2a7849b0aa6f64d0f79a8937

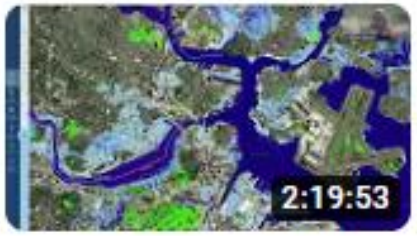
相关资源:

麻萨诸萨州海岸水淹警示模式(MC-FRM)

培训视频

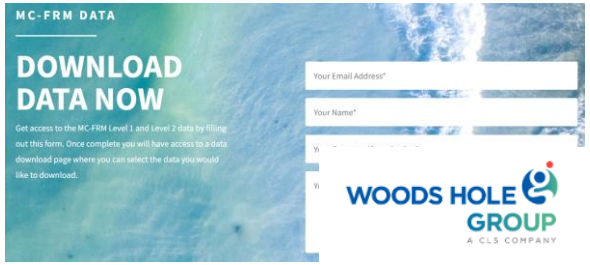
1

2

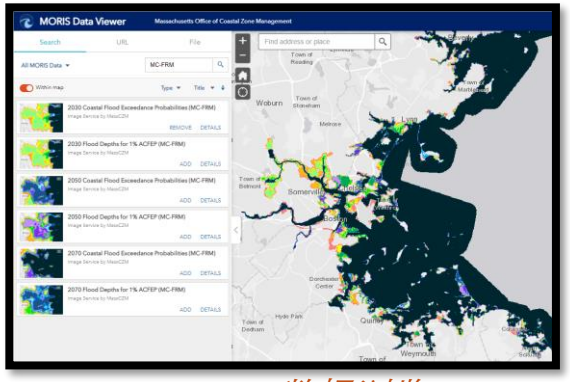


3

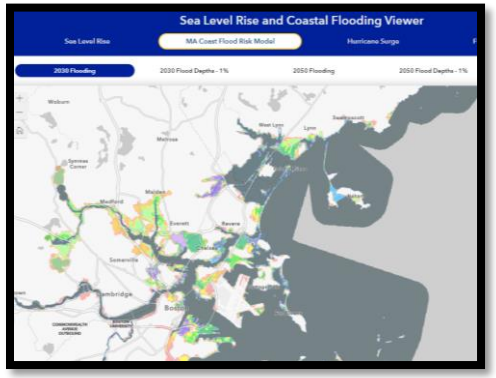
数据下载页



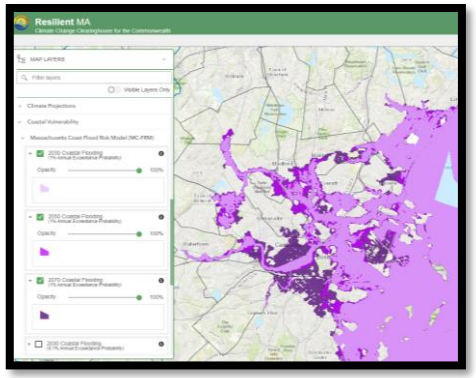
州相关数据浏览



CZM's MORIS 数据浏览



CZM海平面上升以及海岸水淹浏览



ResilientMass 气候以及危险浏览

ResilientMass

Climate Adaption Clearinghouse for the Commonwealth

如有任何问题请发邮件给rmat@mass.gov以联系!

* 请注意：没有全职专门的人员来为与该工具相关的技术问题提供相关的支持，因此请至少留出三到五个工作日来解决问题。