

对话布雷特·米利根：
气候变化时代对创新、跨学科和适应性景观设计的倡议
A Call for Innovative, Multidisciplinary Adaptive Landscape Design
in the Age of Climate Change:
Interview With Brett Milligan



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摘要

布雷特·米利根是一位致力于探究气候变化时代景观行业的未来发展的卓越学者。无论是研究还是实践，他都注重打破对于景观设计的固有观念。他的主要研究对象包括淤泥及其他河流沉积物；参与的实践项目也大多涉及跨学科协同设计，如大坝拆除及生态修复、三角洲栖息地营建等。他将景观本身视为一种动态过程，强调其流动性，以及人类对于景观过程的重要作用。在本文中，米利根就气候变化及其对景观设计所造成的影响等方面展开探讨，并指出我们人类应当敬畏景观自我演变的力量，并基于对这种景观力量的认知和尊重开展实践。在应对气候变化的景观设计实践中，需要更审慎地考虑项目的生命周期问题，同时综合考虑环境、居民、社区和沉积等外部因素，体现对包容性、多样性和人类及其他物种的正义。此外，需要引入公众参与，进一步完善跨学科协同设计方法。最后，米利根介绍了“设计研究”的相关方法，并表达了对推进设计成为一种严谨而独特的知识创造形式的期望。

关键词

气候变化；景观迁移；沉积物；基础设施；协同设计；设计研究

ABSTRACT

Brett Milligan stands out among all the scholars studying the future of the landscape profession in the context of climate change. He studied unique subjects, such as mud and river sediments. His projects often go beyond the usual landscape architecture majors, such as ecological restoration after dam removal and delta habitat creation; His attitude towards landscape is also very characteristic. For example, he treats landscape as a process, believes that people are very important beings in the process of landscape, and that the fluidity of landscape should not be underestimated. Through this article, Milligan points out the responsibility to acknowledge, embrace, and use landscape forces in project planning and design. It is also required to bring about more humility in terms of how we conceptualize the lifespan of a project to cope with climate change impacts. He encourages us to think beyond externalities—such as environment, people, communities, and sediment—as a practice of inclusion, diversity, and justice for humans and others. Relatedly, the public should be included as part of refined transdisciplinary and co-design methods. In the end, he shares his vision of design as a rigorous and unique form of knowledge making through a new Research by Design track.

KEYWORDS

Climate Change; Landscape Migration; Sediment; Infrastructure; Co-Design; Research by Design

布雷特·米利根简介

布雷特·米利根是非营利性疏浚研究合作组织的联合创始人之一，该组织通过举行公共活动和开展跨学科设计实践对沉积过程和沉积景观进行探索。同时，他也是美国加州大学戴维斯分校质变景观研究实验室的负责人，该实验室致力于通过实地调研、民族志和应用设计研究，开展适应加速的气候和环境变化的原型设计。目前，米利根还是美国探索博物馆的设计师和常驻学者，针对旧金山湾区不断变化的沿海边界开展相关探索、监测、设计等工作。

黄伊伟和曾麓语（以下简称“采访者”）：我们之前都参与过您的研究，借此机会，希望能够更深入地了解您对某些概念的看法。让我们从讨论“人类世”（Anthropocene）^①这个概念开始。由联合国教科文组织出版的季刊《信使》于2018年出版了以“欢迎来到人类世！”为题的专刊，并指出地球状况的恶化程度和速度比以往任何时候都更加严重^[1]。您发表的多篇文章中也数次提到人类世的概念，例如发表于《场所》期刊的《景观迁移》一文^[2]。这个概念为什么在景观设计和环境设计领域尤其值得被强调？

米利根：我认为，我们有必要了解人类在多大程度上以及通过什么方式造成了地球的改变，并明确人类在当代对进化驱动的主导作用——从古至今，人类对地球变化所造成的影响已发生改变，而且影响程度悬殊。我们人类既应当明白这一点，也应当始终保持敬畏，因为整体而言，在人类世背景下开展的设计实践已经对地球造成了骇人的影响。虽然很多时候我们无意造成这些影响（图1），但我们的行为可能已经危及我们自身乃至地球上一切其他生物的生存。我绝不是借用“人类世”的说辞虚张声势，好像我们可以通过设计干预来掌控环境，因为很多事

1. 人类影响下的景观：美国亚利桑那州科奇斯县比斯比镇的薰衣草露天铜矿（左图）和与之毗邻的前采矿小镇（右图）（来源：参考文献[3]）
1. Landscape changes under human impacts: The Lavender Open Pit Copper Mine (left) and the former mining town of Bisbee, Cochise County, Arizona, adjacent to it (right) (Source: Ref. [3]).



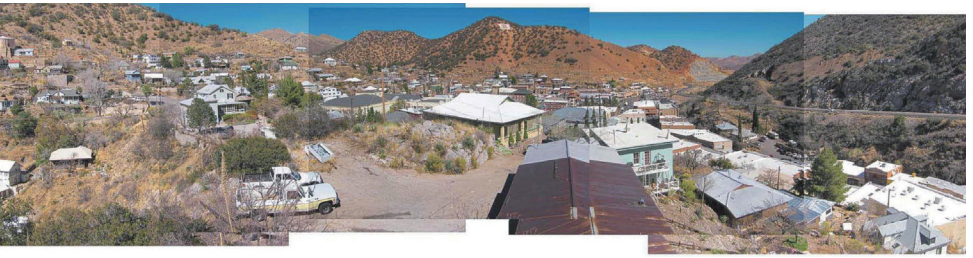
Introduction of Brett Milligan

Brett Milligan is a founding member of the Dredge Research Collaborative, a nonprofit that explores the human alteration and design of sedimentary processes and landscapes through public events and transdisciplinary design. At UC Davis, he is the director of Metamorphic Landscapes, a research lab prototyping adaptation to conditions of accelerated climatic and environmental change through immersive fieldwork, ethnography, and applied design research. Milligan is currently a designer and scholar in residence at the Exploratorium, the Museum of Science, Art, and Human Perception, where he is exploring, monitoring, and engaging with the Bay’s shifting edges.

HUANG Yiwei and ZENG Luyu (INTERVIEWERS hereafter): As both of us were involved in your research before, and we are eager to hear more of your thoughts on some concepts. Let us start with the topic by discussing the concept of “Anthropocene”^①. The UNESCO Courier has published a periodical issue in 2018 entitled “Welcome to the Anthropocene!” and stated that the state of the planet Earth has deteriorated more dramatically and rapidly than ever before^[1]. You have mentioned it in multiple articles as well, for example, “Landscape Migration” in *Places Journal*^[2]. Why is this concept important, especially in the field of landscape architecture and environmental design?

MILLIGAN: I think it is helpful to point out how much and in what ways humans have altered the planet, and that we act as a predominant evolutionary force at this time. That is not to say all humans have an equal role in the past and the present, nor that there are no major power differentials in how that happened. For our species, there is both responsibility with that knowledge and a lot of humility, since if you look at design overall in the Anthropocene, it is a bit scary. We have done so many things that have had unintended and undesirable effects (Fig. 1). We may have jeopardized our survival and the survival of everything else on Earth, so I definitely do not use the term Anthropocene in a sense of bravado,

- ① 本文对于“人类世”概念的讨论是为了强调人类是环境和人类演化进程的一部分，以及人类行为需要被视作环境迁移和演化的一部分。
- ① In this article, we discuss the concept Anthropocene to highlight the fact that humans are part of the environment and human process, and behaviors should be considered as a part of environment migration and evolution.



物无法被掌控，气候变化就很好地证明了这一点。我使用这个词主要是为了表达（人类的）脆弱性：我们人类是否正在自取灭亡？根据目前的观测数据及推演预测，这一问题的答案很可能是肯定的。我非常好奇，“我们”——这个在政治上存在争议但又必须提及的人类这个集体——是否可以改变未来发展的轨迹，以避免我们自己以及许多其他物种消亡的厄运。世界将一如既往地运行和演变，但我们的命运则不一定。历史上，除了我们人类之外，几乎没有任何其他生物能够展望未来，并未雨绸缪开展设计。

采访者：在人类世的语境下，您的研究中常常提及“迁移”（migration）、“变化”（change）、“共同演变”（co-evolution）等关键词。您认为对这些概念的理解将如何有助于我们反思景观设计？

米利根：当谈论“景观迁移”时，我希望人们以一种更宽泛的视角来思考“迁移”概念：迁移讨论的不仅仅是单一物种有规律的空间位移，更是一个在时空维度不断变化的景观集合。一种根深蒂固的思想认为，景观本身是静态不变的，变化的只是在其中的其他事物。然而，景观正随着气候变化和生态转变而加速变化。典型的例子包括气候带已发生迁移，植物物候期也产生了变化，比如植物春季物候期（在气候变化的影响下）越来越提前。景观迁移概念着眼于变化的过程和规律，特别是帮助我们去理解那些已经被改变的景观，从而深入挖掘场所和场所价值等概念。然而，场所变化速度如此之快，以至于我们在文化层面上的观念相对滞后，我们甚至来不及为正在消失的事物感到失落和哀伤。总而言之，景观迁移概念强调在景观设计实践中，对设计时序、应对变化、共同演变的考量与空间和形式同等重要。

我对被彻底改变的景观的关注源自长期的探索过程中亲身参与的一系列实践和研究项目。我的硕士学位论文聚焦美国西南部的露天铜矿，这些地形改造项目的体量之大放眼全球也极为少见。这激发了我开始研究人类地质学的相关内容，以及那些不可逆转的景观。后来，我参与了更多商业实践项目（如美国康迪特大坝拆除及白鲑鱼河生态修复项目，以及横跨俄勒冈和加利福尼亚两州的克拉马斯流域研究项目），在此期间也展开了更多思考：如何通过解放性、恢复性的手段改造这些已经过时的基础设施——而非用殖民性的、破坏性的途径来拆毁、撤除它们^[3]。景观迁移的相关理念也在那一时期逐步成熟。当前我的设计对象依然以被剧烈改变的景观为主，其中尤以低干预修复由19世纪的湿地复垦工程

as if we can control the environment through design, because many things are beyond control and climate change makes that very clear. I use the term primarily to convey vulnerability with the question: Are we, as humans, potentially at an evolutionary dead-end? With all that we can currently observe and model into the future, that is very possible. I truly wonder if “we”—the politically problematic yet necessary we—can change course and if we can prevent our own annihilation and the annihilation of many others. The world will go on, but it might not go on with us. There is very little evidence of this kind of societal change happening in the past, but we are future thinking, designing creatures.

INTERVIEWERS: In your research, under the concept of Anthropocene, a few keywords are frequently mentioned, such as “migration,” “change,” and “co-evolution.” How does the understanding of these concepts help us rethink landscape design?

MILLIGAN: When I discussed the concept of “landscape migration,” it was an invitation to think more broadly about migration: thinking less in terms of patterned movement of individual species, and more that entire landscape assemblies shift and move over time. The deep-set notion that a landscape is a fixed, static thing upon which other things change, is a fiction. It is becoming more and more apparent that landscapes change all the time and are doing so at faster rates because of accelerated climate change and ecological transformations. Clear examples include the change in climate zones for guilds of plant species and asynchronous changes in plant phenology, such as spring flowering occurring earlier and earlier. The concept of landscape migration places emphasis on the processes and patterns of change, and specifically, about how we understand and interpret landscapes with these changes. Such understandings complicate concepts like place and place values. Places are changing so fast that culturally we may have difficulty in keeping up with those rates of change, as well as experiencing loss and mourning for what is vanishing. All in all, the concept of landscape migration puts equal emphasis on designing with time, change, and co-evolution, as it does on space and form.

My interest in working with radical landscape change has been through a long trajectory, which developed through a series of projects, both in practice and in research. The thesis for my Master’s degree was about open-pit copper mines in the southwest US, which are among the largest earthen alterations on the planet. I started to look at anthro-geologic things like that, and things we could not reverse. Later in my commercial practice experience, several projects made me think more about ways to unmake and undo outdated infrastructures to bring about transformation, following pathways that are not colonial and destructive, but attempt to be liberative and restorative, such as the Condit dam removal and the White Salmon River restoration, and the research in Klamath watershed between Oregon and California^[3]. Around that time is when I fully developed the concepts around landscape migration. My work today is still mostly about

形成的景观的项目为主。这些项目场地以及（修复）这类景观所面对的挑战一直吸引着我，让我不得不考虑前面提到的有关人类世的问题。

采访者：在白鲑鱼河生态修复项目中，您和您的团队通过模拟大型洪水事件，将沉积物顺势输送至下游有沉积物需求的场地^[3]。您将景观视为一种动态的过程，而非静止不变的事物。您所参与的设计项目——无论是大坝拆除与生态修复，还是应对景观变化的项目——都强调景观本身的韧性。这在当时是一种相对创新的理念，因为其有别于人类可以设计一切的想法，旨在促进景观自身的不断演化。那么，这种理念在再设计或再开发类型的项目中是如何运用的呢？

米利根：20世纪，人们普遍自恃有能力可以掌控景观过程，这一点在许多垦荒类项目中体现得尤为明显。对于当时的人们来说，湿地存在的意义就在于被开垦利用。我认为（也希望）我们已认识到景观无法被掌控这一事实。人类也许能够干预景观中的某些动态过程或其运行方式，但这类干预只会迫使景观以其他意料之外的方式去适应、运行和变化，最终酿成祸患。我个人认为我们需要敬畏景观自我演变的力量——我们不仅要谦逊地承认景观力量的存在，而且要认识到这种力量具有与人类改造本质不同的、无法被掌控的集群能力。今天，我们的大部分设计工作都基于对景观力量的认知和尊重，以及对这种力量的科学利用。而这种设计思维和实施方式与19和20世纪时相比，已发生了巨大改观——数百年来，我们都在错误地、不公正地干预景观过程。举例而言，我们已经认识到我们无法阻止海平面上升。现在，我们需要思考的问题是如何恢复那些由殖民开荒、采掘和基于资本的设计实践造就的景观的力量。

采访者：众所周知，近年来，美国加利福尼亚州（以下简称“加州”）饱受气候变化之苦，面临山火频发、局部干旱、海平面上升等问题^[4]。当地州政府、高校和其他机构也针对气候变化带来的影响积极开展研究工作。您也针对加州，特别是加利福尼亚三角洲（以下简称“三角洲”）、海湾三角洲^②等地开展了关于水、沉积物及生态修复的诸多研

radically altered landscapes, particularly land reclamation and the eradication of wetlands in the 19th century and trying to undo so much of that work. I have always been drawn to these kinds of places and the challenges they present. They make me have to work with that Anthropocene question mentioned earlier.

INTERVIEWERS: We know that in the White Salmon River restoration project, you and your teammates were simulating extreme flood events so that to beneficially move the sediment downstream to where it was needed^[3]. This was a relatively innovative idea at the time as you treated landscape as a process, instead of a static thing. When you are talking about dam removal and restoration, or landscape shifting, you are also relying on the landscape itself to be resilient. It is unlike the idea that humans design everything, but instead, give the power to landscape itself to continuously evolve. Has this notion embedded in this redesign or redevelopment process?

MILLIGAN: In the past century, there was a general, colonial sense that “we” could control those processes. That was what a lot of reclamation projects were all about. To the settlers at the time, wetlands were there to be transformed. I think (or hope) we have learned that landscapes cannot be controlled. One might be able to arrest certain processes and movements, but that just makes landscapes adapt, move, and change in other ways that were not planned for, which can be detrimental. I personally think that we need to acknowledge these forces as agents of their own—to humbly acknowledge their presence and collective capacities as fundamentally different from our own, rather than thinking that they can be controlled. Most of the work we are doing today is to embrace and use these landscape forces, moving beyond just acknowledging them. I think that is a fundamental difference between design thinking and engineering in the 19th and 20th centuries and what some are trying to do now, given all the mistakes and injustices from the past couple of centuries. For example, we cannot stop sea level rise. It is a question of how we are going to work with that evolutionary trajectory, all mostly caused by legacies of colonial, extractive, and capitalist design efforts.

INTERVIEWERS: As we all know, California has been affected by climate change in recent years, including frequent wildfires, local droughts, and rising sea levels^[4]. California government departments, universities, and other research agencies are also actively addressing the impact of climate change. Most of your research about water, sediment, and ecological restoration are in California, especially in California Delta (the Delta hereafter) and the Bay Delta^②. Can you

② 萨克拉门托－圣华金河三角洲，又称“加利福尼亚三角洲”或“三角洲”，指加利福尼亚州北部广阔的内陆河三角洲及其河口区域。旧金山湾，又称“海湾三角洲”，是三大海湾（休松湾、圣巴勃罗湾和旧金山湾）的统称。人们时常用“三角洲”或“湾三角洲”代称旧金山湾和萨克拉门托－圣华金河三角洲所在的整个地区。

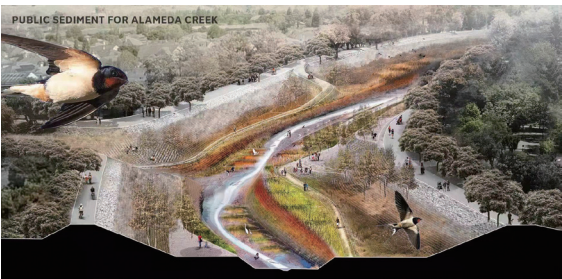
② The Sacramento-San Joaquin River Delta, or the often called “California Delta” or “the Delta,” is an expansive inland river delta and estuary in Northern California. The San Francisco Bay, or “the Bay Delta,” encompasses three major bays—Suisun Bay, San Pablo Bay, and San Francisco Bay. In some circumstances, people may use the Delta or the Bay Delta to represent a combination of the entire region of the Sacramento-San Joaquin River Delta and the San Francisco Bay.

究。您能否谈一谈加州的景观随时间的推移而发生的变化、当今气候变化对其所造成的影响，以及景观设计项目随之发生了怎样的变化？

米利根：海湾三角洲与三角洲密切相关，难以分开研究。在三角洲早期的填海工程中，湿地仍被视为无用的荒地，全部经历了开垦改造。在西方殖民者到来之前，许多美洲原住民部落曾以游牧或半游牧的方式在那里生活，对于年复一年的洪水他们也能从容应对。曾经的三角洲持续处于动态变化过程之中：作为美洲西海岸最大的洪泛区之一，这里在冬季通常因洪水泛滥形成广阔的内陆海，并在夏季排干。欧洲殖民者的到来改变了这一切：他们铺设排水管道、建造堤坝，将拥有丰富栖息地资源的洪泛平原和湿地几乎都改造成了农田，导致依托这种动态景观的水生生态难以维系，相关迁徙物种大量消亡。

这片垦区上后续兴建了加州水利工程——从水资源较为丰沛的加州北部地区取水，输送至南部地区——三角洲作为项目中转站，水文环境遭受了不可逆的巨变。此前的垦荒行为导致泥炭土因干旱蒸发而不断损耗，致使地面沉降，如今三角洲很多区域的地面高程低于海平面逾6m^[5]。在气候变化和海平面上升的影响下，堤坝系统也愈发脆弱，难以应对环境变化。人们普遍认为三角洲在生态和结构上无法保持现状，它将会且早已开始快速改变。对此，人们正在努力思考对策，并试图预测三角洲快速变化的结果。我们必须以新的价值标准对三角洲进行“改造”，以应对不同的环境条件和气候变化影响（图2）。

要了解景观项目中所采用的设计策略发生了怎样的变化，首先，我们需要回答以下问题：在气候变化背景下，景观项目是什么或可以是什么？景观设计师在其中的角色是什么、应该怎么做，以及为什么那样做？我们需要致力于解决哪些问题以及预期目标是什么？诚然，许多项目仍无法充分应对气候变化所带来的复杂性问题。如果我们在规划和设计项目中真正地、彻底地将气候变化影响纳入考量，则需要更审慎地考虑项目的生命周期问题。这是设计中最难以回答的一个问题——你要



talk more about how this landscape has changed overtime, and how is it impacted by climate change today? And how are landscape architecture projects done differently?

MILLIGAN: It is hard to separate the Bay Delta estuary from the Delta, because they are interconnected. The Delta has been completely engineered, as one of those early reclamation projects, again where wetlands were considered wastelands. Prior to Western colonization, there were a lot of native American tribes that lived there and had nomadic to semi nomadic lifestyles, all attuned to the annual flooding of the Delta. The Delta was a very dynamic, massive floodplain: one of the largest on the western coast of the Americas, which would often become a vast inland sea during winter flooding and drained out during the summer. All of that changed when European settlers turned this very rich habitat of floodplains and wetlands mostly into farmland by re-plumbing the landscape and building levees. That has since had a devastating effect on the aquatic ecology and migratory species that would use this dynamic landscape.

The California State Water projects were then piggybacked onto that reclamation infrastructure, as the Delta became a switching yard for taking water from the wetter, northern half of the state, and exporting it to the southern part. It became the fulcrum of the state's water system and has been very controversial ever since. Reclamation also led to subsidence: the loss of peat soil due to drying out. Many areas in the Delta are now more than 20 feet below sea level^[5]. With climate change and sea level rise, the levee system is becoming increasingly vulnerable and hard to sustain. There is a general acknowledgement that ecologically and structurally the Delta cannot remain what it is. It will change and it already rapidly does. People are struggling with how to deal with these changes and figuring out what the Delta is as a rapidly evolving place. We have to “reclaim” the Delta again for a different set of values, with a different set of conditions, and with climate change (Fig. 2).

To answer the question on how we do landscape architecture projects differently, I would say we need to define what a landscape architecture project is or can be with respect to climate change? What are landscape architects getting involved in and how and why? Where are we focusing our efforts and to what effect? I agree that many projects still struggle to fully grapple with the complexities of climate change. If climate change impacts are truly and thoroughly integrated into project planning and design, it will likely bring about more humility in terms of how we conceptualize the lifespan of a project. Is that not one of the hardest questions—how long are you designing for? It is challenging because the further out you go into the future, the bleaker and more indeterminate it could be. We clearly need to be able to accommodate and adapt to a much wider range of conditions than in the past. I live in California, where even prior to climate change, the state had a much more volatile, extreme climate than the rest of the United States. Precipitation, storms, and droughts here are very intense. It is just going to get more so.

One area where I think landscape architecture projects can really make a

为多长时间来设计？解答这个问题的难点在于：眼光越长远，变化越未知。很明显，我们不得不适应比过去更复杂的情况。我生活在加州，即使在气候变化（的问题走进公众视野）之前，这里的气候也比美国其他地区更加不稳定，极端气候事件发生频率更高。降水、风暴和干旱等灾害的程度不断加剧，以后只会更加肆虐。

我认为景观设计项目可以真正发挥作用的一个领域是防洪，这也是我们长久以来所面临的最严峻的问题之一。整个“防洪”（flood control）概念建立在我们可以控制洪水且可以保障洪泛平原及沿海地区的安全的假设之上。例如，与三角洲一样，加州首府萨克拉门托市主要建设在极不稳定、洪水泛滥的河流低漫滩上，是整个美国最容易遭受洪水侵袭的城市之一。无论是从技术上、生活上，还是生态上来说，整个城市建设的所有前提都是错误的，而且这些错误建设带来的风险和损失还在不断增加。这类似于人们常常谈论（在美国）高速公路和街道如何割裂了社区，但却很少谈论防洪基础设施如何彻底改变了我们的人居及建设格局。现在，景观设计项目中已不再常常讨论如何“防洪”——因为洪水不可控、不可“防”——转而关注我们愿意承受多大的风险。

在我看来，之于景观设计和其他学科的一个核心问题是，我们要如何对待这些历史遗留景观，并停止增建不再有效的工程项目。我们过去曾试图阻隔洪水，但这一目标不可能达成，那么我们要如何适应洪水呢？如何将战略性的撤离作为我们最具适应性的长期选择？加州中央河谷近期开展的洪水管理项目为我们提供了一些思路参考。该项目目标包括改造美国陆军工程兵团（USACE）建设的大型萨克拉门托堰和优乐泄洪渠（图3）。作为一项工作重心，很多景观设计师非常擅长在项目中融合多种价值和功能需求，整合不同利益相关者的想法——无论是技术性、科学性建议，还是出于生活经验——从而制定一个综合性的设计方案。我们不能向这些利益相关者强行灌输价值观，而是须从他们那里获得更具体验性的、基于场地的建议，并在设计中予以回应——这是确保项目成功的关键。日后，综合考虑多种不同的利益以产生多效益的结果将成为所有适应性设计得以推进并取得成功的一项基本要求。

2. 米利根基于对景观自我演变力量的认知和尊重在三角洲展开的实践探索（来源：参考文献[8]）。
3. 2017年洪水期间的萨克拉门托堰和优乐泄洪渠（来源：参考文献[6]）。
2. One of Milligan's projects in the Delta, valuing the existence of landscape forces [Source: Ref. [8]].
3. Sacramento Weir and Yolo Bypass during a 2017 flood event [Source: Ref. [6]].

difference is flood control, which is one of the most problematic legacies we face. The whole notion of “flood control” assumes that we could control floods and that we could build safely in floodplains and coastal areas. For example, the city of Sacramento is one of the country’s most vulnerable cities to flooding, because, like the Delta, it is mostly built on the low floodplains of one of the most volatile, flooding rivers in the country. All the premises here were wrong—technically, colonially, and ecologically, and the risks and losses from those mismeasures keep growing. We talk less about how flood control infrastructure has completely altered our settlement patterns and where we think we can build. It is similar to the way that people more commonly talk about how highways and streets in the United States divided communities. The paradigm shift happening now is that we do not speak about flood control, because we cannot control floods. It is more about how much risk we are willing to tolerate.

To me, a central question for our discipline and others, is how to adapt and work with this legacy and the un-building of so much that increasingly does not work. How do we embrace flooding, since we will not be able to banish it like we tried to do in the past? How do we embrace strategic retreat as our most adaptive long-term option? Recent flood management efforts in California’s Central Valley provide an interesting example of where we might work towards, including the Yolo Bypass and the retrofitting of the massive Sacramento River and Valley Project by the United States Army Corps of Engineers (USACE) (Fig. 3). Many landscape architects are pretty good at melding multiple values and functions into projects as a core element of how we try to work. We are able to take in different stakeholders’ perspectives, whether those are technical and scientific, or from lived experience, and integrate them into a cohesive design. We have to get at the more experiential, place-based experience of people and speak to that experience for projects to be successful, because imposing values does not get us anywhere. Taking into account multiple different interests to produce multi-benefit outcomes is going to be a basic requirement of adaptation efforts going forward, for it to be successful.



3 © Brett Milligan

采访者：基于您提到的这些项目，您认为有哪些基本概念值得景观设计师展开讨论？哪些观念应该转变？我们应该如何改变教育下一代的方式？就像您曾建议我们打破对于“基础设施”（infrastructure）的固有观念一样。

米利根：基础设施的定义很复杂。20世纪，我们忽略了环境、居民和社区等社会和生态因素——这些被排除的因素被通称作“外部因素”——将基础设施简单地等同于道路和水坝等典型的硬质基础设施。例如，在旧金山湾区（以下简称“湾区”），当人们为建造大片郊区设计泄洪渠时，设计方案以促进经济发展为主要目标，完全忽视了生态效益和服务，对这片洪泛平原及其生态功能造成了巨大损害。泄洪渠建成后，周边开发建设活动肆意开展。此外，沉积物也是一类外部因素。当USACE为设计泄洪渠系统建模时，他们仅考虑了水流，却忽略了沉积这种基本的景观过程。因而在泄洪渠系统建成后，渠道内部被沉积物填满，需要投入大量资金定期疏浚。这种情况的发生同样是因为在设计过程中缺乏对生态功能的考虑。

无论是因为认知欠缺造成的忽略，还是设计师的有意为之，最终，项目自建成起不断受到来自这些外部因素的负面影响，因而不得不将它们视作内部因素重新审视。因此，教育下一代时至关重要的是要鼓励他们将这些外部因素纳入考量，这样才能在实践中体现对包容性、多样性和人类及其他物种的正义。

与此相关的是，我认为我们应该更加重视在学科中完善跨学科协同设计方法。跨学科设计不仅是与不同学科的合作，而且还应该引入公众参与。找到能将不同的利益相关方聚集在一起、实现跨学科协同设计的方法是很困难的，尤其是对于项目利益相关方代表性的考虑（谁参与谁不参与），特别是考虑到政治和种族因素时。

最后，正如我之前所提到的，我认为讨论项目的生命周期和不确定性至关重要。在气候变化背景下这的确是一个难题，因为对这个问题的答案从根本上决定了这个项目的使命和目标。项目的生命周期和未来发展直接关乎我们该如何设计。

采访者：既然谈到了设计过程，那么您认为那些涉及不同学术背景、社会阶层，或是对同一景观持不同看法的利益相关者的成功项目，其设计过程中的关键是什么？

INTERVIEWERS: During the participation of these projects mentioned, what are the fundamental concepts that landscape architects should start to debate on? What mindsets should be changed? And how should we educate the next generation differently? For example, you suggested that we are challenging what infrastructure is.

MILLIGAN: The definition of infrastructure is complex. There is the typical old hardware stuff like we thought it was in the 20th century, such as roads and dams, but that notion left out social and ecological factors. In the past, we excluded things like the environment, people, and communities from the target audience of essential design considerations, which makes them the so-called “externalities.” For example, in the Bay Area, when they designed these flood control channels to build massive swaths of suburbia, they did not account for the loss of floodplains and ecological functions. They put in the channels and then they just allowed development to happen all around them. The design and the economic rationale externalized all ecological benefits and services. Another externality was sediment. When the USACE modeled the design of the channels, they modeled with only water moving through them. They left out the basic landscape process of sedimentation, so the channels filled in with sediments after being built, which requires a large amount of money to periodically dredge. Both examples manifest the lack of consideration of ecological functions.

In the end, these externalities have since haunted these projects, because externalities do not just go away. They assert themselves as the overlooked internalities they are. Externalities are only limits in imagination, or else willfully done, when designing these projects. Educating upcoming generations to think beyond externalities, as a practice of inclusion, diversity, and justice for humans and others is critical.

Relatedly, I think we should place more emphasis on refining transdisciplinary and co-design methods in the discipline. I define transdisciplinary design as not just interdisciplinary work, but also work alongside the public. Figuring out the methods to bring different stakeholders together to co-design and achieve interdisciplinary work is hard, particularly around representation: who is involved on these projects and who is not, based on politics and racial influences.

Lastly, as I hinted at earlier, I think that it is vital to debate how time horizons and uncertainty factor into projects. That is a hard climate change question, because where you put that line is going to radically change how you think about what that project should do. When you start thinking about those time horizons and looking at the future, all of the calculations change.

INTERVIEWERS: Since you talked about the design process, for the projects that are successful, especially the ones which involve many stakeholders with different academic backgrounds, social classes, and understanding of the same landscape, what are the key components in the design process?

米利根：这个问题很难回答。一般来说，我认为在一个项目中试图达成共识是一种迷思，尤其是在当今各政治形态间冲突不断的语境下。在实践中，项目面临着大量差异化、多样化的意见。在地理学和人类学中，专家们将这些意见称为“非共性因素”。公共空间通常实际上包含一系列“非共性因素”，包含人们针对同一事件所提出的不同观点。譬如，每个人对同一座公园中游憩活动的预期可能各不相同：你可能想自己烧烤，我可能想躺在毯子上看书，但却被外放的音乐所打扰。人们在如何创造和使用空间、如何看待景观，以及如何衡量景观价值上的观念也各不相同。设计的关键并非试图达成共识，而在于如何尊重差异，促进景观内涵和形式的多样性。以我近期参与的美国加利福尼亚州弗兰克斯片区预景项目^③为例，该项目的大部分设计精力投注在这片下陷的同质化区域中创造多样化的形式，以满足各利益相关方相互冲突的多样化需求。当地政府对该项目提出了生态修复的要求，希望减少海水侵入，从而修复三角洲的湿地。然而，这一要求当即损害了游憩和划船群体的利益。除了气候变化和海平面上升的影响之外，以上这些因素都需纳入综合考虑的范畴。我认为，如何处理这些“非共性因素”是决定项目能否取得成功的关键。

过去五年中我参与了许多项目，其中不乏相对复杂或政治上存在争议的项目，比如湾区韧性设计竞赛中的公共沉积物项目和弗兰克斯片区预景项目。期间设计灵感迸发的瞬间往往没有发生在我们伏案工作的时候，而是团队讨论的过程之中。有人说设计方案往往诞生于积极的沟通与交流，而公共沉积物项目正是如此。我们与政府机构和当地居民聚在一起，一同勾勒未来蓝图，借此机会实际听到和看到了人们对设计的需求，并就此做出了一些重大决定。唯有提出能够满足多种需求的设计理念，我们才能真正获得各方对项目的支持。虽然这听起来很简单，但是真切的面对面互动非常重要。在我参与过的很多项目（比如加州干旱相关的研究）中，面对面交谈始终是促成真正变革的创造性时刻。

采访者：在您参与的一些项目中，不仅组织了面对面的互动交流互动，还引入了技术手段来推动讨论，例如公共沉积物项目中的实体地貌沙床建模和数字投影建模技术，以及弗兰克斯片区预景中的流体动力学建模技术。您为什么将技术融入您的研究中？它在设计中如何发挥着作用？

米利根：在弗兰克斯片区预景项目中，我们首先邀请公众和其他利益相关方代表自己绘制地图，以了解他们对项目用地的使用方式和价值

MILLIGAN: Tough question. Generally, I think it is a myth that one can find consensus in a project, especially in today’s conflicting state of politics. In reality, projects are composed of a great deal of difference and diversity in opinion. In Geography and Anthropology, experts speak of these as un-commons. A commons is often actually an un-commons, meaning it is composed of diverse people bringing different perspectives to the same thing. For example, you can go to a park, and you might have a different perception of what you want to do in that park. You might want to bring your own barbecue; I might want to lie on a blanket and read my book, and I do not like your music. There are different ways we make and inhabit space, as well as what we think about and how we value landscapes. Rather than relying on consensus, how we build respect for differences and plan for diversity in landscapes—both in uses and forms—will be the key. For instance, with the recent Franks Tract Futures project^③, so much of the project effort was devoted to taking a homogeneous and subsided tract and diversifying its form to accommodate vastly different, competing stakeholder interests. Here the state wanted to reduce salinity intrusion and restore wetland habitat to meet restoration mandates, but these goals were initially at odds with local recreational and boating communities whom it would negatively impact. All of these impacts had to be considered and reconciled, along with designing for climate change and sea level rise. How we deal with those un-commons is the key component for me.

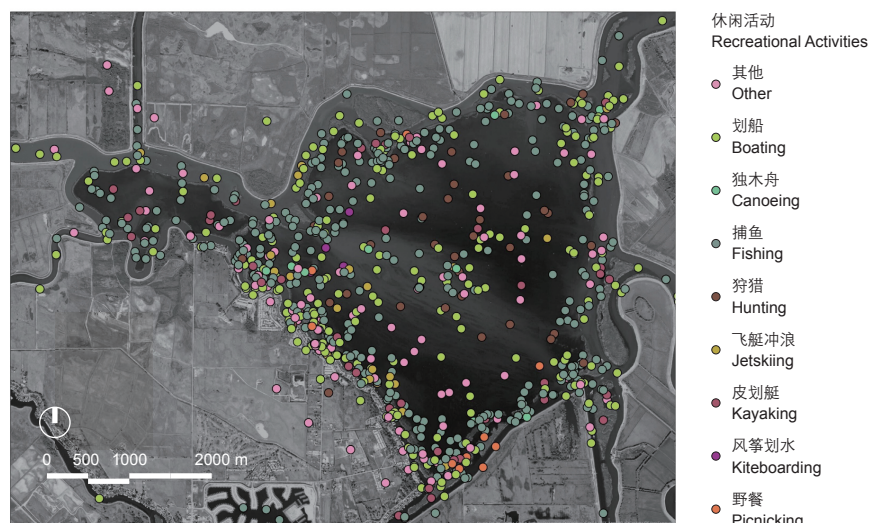
In all the projects I have worked on over the last five years, and particularly the more complex and politically contested ones, like the Public Sediment project from the Resilient by Design Bay Area Challenge and Franks Tract Futures, the biggest design “aha” moments were not when we were in front of a computer screen; They happened when we were in groups or workshops working together. I have learned that design often happens in a highly social context. Some of the biggest achievements for the Public Sediment project happened when we had the agencies and the residents in a room, where we could draw on trace papers and actually hear the perspectives and see underlying wants that people had for the design. That is where we actually got project buy-in, to come up with concepts that could accommodate different perspectives and interests. There is so much value in the actual face-to-face interaction. I know that sounds very simple, but in so many things that I have worked on, such as research on drought in California, it is the face-to-face conversations that consistently are the most useful and creative moments for real change.

INTERVIEWERS: Besides the social interactions, some of your projects have brought technologies in to facilitate the discussion, such as the physical geomorphology table modeling and the digital projection modeling in the Public Sediment project, and the hydrodynamic modeling in the Franks Tract project. Why do you integrate technology in your research? And how is it beneficial?

MILLIGAN: In the Franks Tract Project, we first asked stakeholders and the public to make their own maps of how they use and value the tract, and what kinds

③ 米利根教授在2018～2020年间参与了弗兰克斯片区预景项目。有关该项目的更多信息，请参阅参考文献[4]，或访问弗兰克斯片区预景官网。

③ Milligan was involved in the Franks Tract Futures project between 2018 ~ 2020. For more information on the project, please see Ref. [4], or visit Franks Tract Futures official website.



评估，以及他们所希望看到的变化。通过基于网页和移动端设备的地理信息系统的在线调查，用户可以在项目用地的地图上画出他们喜欢的划船路线，标注出他们期望重建的地点和内容，并指出他们认为可以设置潮汐沼泽地而不至于损害自身游憩机会的位置（图4）。这些用户自主绘制的地图向设计者直观地展示出不同利益相关方的偏好，为形成具有不同布局方式的不同设计方案提供了基础。调查结果显示，用户普遍希望码头继续开放，希望码头前有开阔的水域，并维护区域中的现有水路（一种供当地居民快速穿行的航线）。我们采纳了这些反馈意见，从而生成了初步的设计概念，并借助SCHISM（一种分析水流速度和盐度的水动力建模软件）对设计方案进行水力建模。经过模型推演，我们发现这一轮提出的许多方案都会因为水路过宽而仍无法避免海水侵入问题。我们继而与当地社区居民协商他们可能接受的水道的宽度。也有利益相关方基于形成风障和最大化使用价值等目标提出了对土地组织方式的建议，以期提供更好地发挥场地的游憩功能。据此，我们修改了设计方案，包括重新设计地形、缩窄水道宽度、优化水道方向，并再次建模。最终选定的设计方案对于抑制三角洲海水侵入的效果最佳，同时能够满足预期的游憩和生态需求。本项目经历了反复的设计迭代，其中建模技术是整个过程的基础，用以验证方案能否满足各项具体标准和目标。尽管这种设计过程需要耗费更多的时间和精力，但设计方案的各方面都得到了改进。

我们为公共沉积物项目建立的投影模型以湾区的CNC切割地形模型为底，在这个模型上投影海平面上升的预测高度，以及恢复和维持湾区

of changes they would like to see happen. This was done through a soft-GIS online survey, where participants could draw in their preferred boating routes on a map of the Franks Tract, pinpoint where and how they recreate, and indicate where they think tidal marsh could be located without ruining recreational opportunities (Fig. 4). These user-based maps were the basis for the creation of a broad range of designs with different configurations to see what different stakeholders liked and did not like. They wanted to make sure that their marinas were kept open, that there was open water in front of those marinas, and that water pathways through the Tract (a kind of water highway for local residents) were maintained. So, we took those requests and that became the first round of design concepts for us to go and hydro-modeled these results through a SCHISM model, a hydrodynamic modeling software that can analyze velocities and salinity. Through the modeling, we found out many of our first round proposed plans would fail because salinity still came through the wide channels. We then told the community about this result, and researched the channel widths in the Delta that communities are happy with. The stakeholders also proposed how the land configurations could better support recreational uses in terms of the location and orientation of shelter coves to provide wind protection and optimal use value. Then we designed again: reconfigured those landforms, narrowed down the width of the channels, optimized the orientation of the channels for the design, and modeled it again. Eventually, the preferred concept for the design was the one that was also the best at reducing salinity in the Delta, while meeting recreational and ecological goals. So, it was a very iterative design approach, in which modeling was foundational to the whole process to meet very specific multi-benefit criteria. Even though it required more time and effort, all aspects of the design were improved by having that modeling.

The projection model for the Public Sediment project was a CNC-cut topographic model of the Bay Area onto which we projected sea level rise and how much sediment was needed to restore and maintain the tidal marshes around

4. 弗兰克斯片区预景项目用户调查结果，图中分别展示出当地居民现有的休闲活动（图4-1）和区域中的航线（图4-2）（来源：参考文献[7]）。
4. Franks Tract Futures Project user survey results. The results showed existing recreational activities [Fig. 4-1] and boating routes for residents across the region [Fig. 4-2]. [Source: Ref. [7]].

边缘的潮汐沼泽所需的沉积物规模。我们试图通过投影模型向公众直观地展示沉积物在海湾—三角洲的移动路径，让人们认识到其复杂性（图5）。这并不容易，但是人们需要理解沉积物对于建立海岸韧性、适应海平面上升的重要性。这与过去在上游地区建造大坝的方式截然不同，我们尝试通过包括投影模型在内的各种可视化和建模途径向公众展示出这些信息。起初，人们不明白我们为什么如此执著于研究沉积物，只有通过一些技术可视化途径，才能使人们明白为什么沉积物短缺是世界各地沿海地区都面临的严峻问题。

同样，我们建立了河道实体模型，并借助地貌沙床模型观察其中发生的沉积过程（图6）。沉积物模型是很好的探索工具，但我们的实验结果并不精确，因为沉积物颗粒无法如场地模型一般按比例缩小。我经常谈到的“景观途径”是多种设计手段的集成，强调对不同设计手段的综合运用。技术、建模和数据途径都是更广义上的美学、价值观、使用者偏好和物质性的一部分。技术途径非常重要，可以跨平台对比各种设计方案，但是任何模型都无法完美诠释或复刻真实景观，因此建模推演所获得的结果无法与实际结果完全相同。

采访者：最后，我们谈一谈“设计研究”（Research by Design）。您在风景园林教育工作者委员会（CELA）的2019年年度会议中提出了这项新议题，收到了很多业内同仁的积极反馈。“设计研究”有望发展为探究不确定性的新策略，恰与气候变化时代所面临的问题相吻合。请您谈谈这项议题提出的背景。

米利根：“设计研究”将设计过程作为研究方法，主张设计是一种创造和发现知识的形式，与过程概念紧密相关。我认为设计过程与最终结果同样重要，因此期望设计研究的途径能够引导我们更专注并且以更

the Bay Area overtime. Using the model, we tried to help the public to understand how the sediment moves through the Bay-Delta and its complexities (Fig. 5). It was not easy, but we wanted to tell people why sediments are so important for coastal resilience and adapting to sea level rise. That was one example where we used visualizations and modeling to inform the public, taking quantitative information of how much sediments come into the bay, which is radically different from what it was before the building of all the upstream dams that hold it back. When we started off, people did not understand why we were so focused on mud, and it was only through some of the technical visualizations that people understood why sediment supply is such a problem for coastal regions around the world.

Likewise, we did actual physical modeling of the channel and looked at sedimentation through a geomorphology table (Fig. 6). Sediment models are great learning tools; however, the results are not exact because the actual sizes of sediments cannot be scaled down with the model. I often talk about a “landscape approach” and to me that implies an integration of multiple threads and how do you bring them all together. Technology, modeling, and scientific information are just one piece within other concerns of aesthetics, values, user preferences, and materiality. The technical component is hugely important, and it is helpful to compare and triangulate results across multiple media. But also keeping in mind that any model is not the same as the actual landscape, and can never achieve full fidelity in trying to interpret and replicate it.

INTERVIEWERS: Lastly, let us talk about the track “Research by Design.” In 2019, you proposed this new track at the annual conference of Council of Educators in Landscape Architecture (CELA) and received much positive feedback from the profession. Research by design also echoes with the issue of climate change, as it might become a new strategy to test uncertainties. Can you share a little bit about its origins, and why did you bring it up as a new track?

MILLIGAN: Research by Design is using a design process as a form of research. It is a way of thinking of design as a form of knowledge-making and discovery, which is related to the idea of process. I think that the design process is equally



5. 项目团队建立的投影模型展示出沉积物在阿拉米达溪流域至湾区的移动路径。
6. 项目团队通过水文地貌沙床模型研究泄洪渠的设计（来源：参考文献[8]）
5. Projection model of sediment flow through Alameda Creek watershed to the Bay Area
6. The team used hydro-geomorphology modeling table to study flood control channel design [Source: Ref. [8]].

加严谨和批判性的态度反思设计过程本身。设计虽然具备不同于理科的特征和竞争力，但同样注重实证和实验价值：设计不仅具备实验性，而且需要切实解决一种形势或现状问题，还需要严谨地探索和理解这些变化。

我与罗伯·赫尔墨斯合作完成的“棘手的生态”项目是此类设计研究的一个实例^[9]。我们将三角洲整体当作研究对象，使用情景规划法展望其未来50年后的景象，以此确定关键的不确定性因素及相应发展趋势。我们设想了多种极端条件设计方案，如斥巨资继续完善其防护堤体系以维持现状，或是一场20年一遇的旱灾强硬地终止了加州水利计划，也终止了该输水计划对三角洲所造成的影响，此后完全任其自由演变。这些情景设置就是该项目的设计推演途径，我们可从中探知未来发展趋势。这些情景既可展示出未来的各种可能性，也可用于各利益相关方制定更加标准化的方案、达成更广泛的沟通。

在景观设计学界，有些学者积极投身于设计研究，有些主要致力于研究他人的设计实践。前者通常在学术研究信度、效力或空间上有所不足。CELA主要为推动学科的学术发展而设立，我们提出将“设计研究”作为其分论坛的议题，目的是为推进设计成为一种严谨而独特的知识创造形式搭建专门的平台。**LAF**

important as the end results. Through the research by design track, we wanted to focus on the design process itself for rigorous and critical reflection. Design has its own characteristics and capacities that are different from science, but also has ways that it can parallel its empiricism and test-oriented qualities. Design research is inherently projective. You are trying to do an experiment, but you are also actually trying to change a situation or context and to be rigorous in how you model and understand those changes.

One example is a project that I have done in collaboration with Rob Holmes called Wicked Ecologies^[9]. We looked at the Delta as a whole and used scenario-planning to look 50 years into the future and identify key uncertainties and trends. We wanted to use design to figure out what the Delta might look like in 50 years under a range of conditions, beyond normative preference, such as one of heavy investment in its levees to maintain the status quo, another where there was a 20-year drought that effectively ended water exports and reliance on the Delta, freeing to evolve differently. These scenarios are a way of design-producing knowledge about what the future could be and taking these scenarios to stakeholders for a more normative approach and conversation about their wants and needs, based on those possibilities.

In landscape architecture academia, there are people who are doing active design research and there are those who predominantly write about other people’s design. Often, the former are not given the same credence, efficacy, or space as the more academic approach. Because CELA is primarily for landscape architecture academics, we created the new Research by Design track to have a dedicated space where participants can advance design as a rigorous and unique form of knowledge making. **LAF**

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