



## Local implementation of a national program: The National Estuary Program response following the Deepwater Horizon oil spill in the Gulf of Mexico



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### ABSTRACT

The US Environmental Protection Agency's National Estuary Program (NEP) was established in 1987 under the Clean Water Act to improve the water quality and ecological integrity of estuaries of national importance. There are twenty-eight individual local programs in the NEP, covering watersheds in eighteen coastal states and Puerto Rico. Each is charged with bringing together citizens, scientists, businesses and government officials to collaboratively solve environmental problems and promote healthy, vibrant communities. Decisions are based on sound science and actions are implemented using adaptive management strategies. With expertise and comprehensive local networks, each local NEP is able to serve as a foundation for addressing emerging environmental problems, including hazardous events, such as oil spills and hurricanes. An example is the unique role that the NEPs along the Gulf of Mexico played during the Deepwater Horizon oil spill. Immediately following the spill, while federal and state agencies and oil industry experts worked to contain the spill, local communities were faced with conflicting and confusing information about the activities. The NEPs provided credible and continuously-updated information to local communities; led major outreach efforts in their communities concerning the event; and served as conduits for scientific information and data to local, state and federal agency scientists and officials. Gulf NEPs continued to facilitate community involvement and provide long-term assistance to the state and federal recovery efforts along the Gulf, and are now coordinating community-based restoration efforts to assist in the long-term recovery of the resources and communities along the Gulf coast.

### 1. Introduction

On April 20, 2010, the Deepwater Horizon oil rig drilling the Macondo well exploded 52 miles offshore the Louisiana coast, with a loss of life of 11 workers and 17 more injured. In addition to the terrible loss of life, significant environmental impacts from the spilled oil ensued. Days later, underwater oil leaks on the sea floor were discovered. Efforts to stop the leak failed and oil continued to discharge into the Gulf of Mexico for months. By the time the leak was capped in July 2010, nearly 5 million barrels of oil (approximately 200 million gallons) had been spilled into the Gulf of Mexico and over 600 miles of Gulf of Mexico coastline were impacted [6]. In the face of the largest

marine oil spill in national history, the United States federal government stepped in to manage the spill response, cleanup, and to conduct a natural resource damage assessment. The national media rushed to provide news of events surrounding the spill.

While the federal government, state agencies, British Petroleum (BP) and other oil industry experts worked to contain the spill and its damage, local communities along the Gulf Coast were primarily left to learn about what was happening from local and national media outlets, which used a variety of information – accurate and sometimes inaccurate – for their reports. It was difficult to understand the complex federal oil spill response process or to know how the spill would affect wildlife, fisheries, tourism, culture and jobs. Frequently asked questions

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included: How does one separate fact from rumor about the extent of the spill, the dangers and benefits of cleanup technologies, and the effects on the local economy? How can the local citizens, adults and children alike, deal with the uncertainty and fear? Is seafood harvested from the Gulf and estuaries safe to eat? How can the average citizen help?

The U.S. Environmental Protection Agency's (USEPA) National Estuary Program (NEP) is dedicated to the preservation and restoration of the United States estuaries (Clean Water Act Section 320). The twenty-eight individual programs, located in coastal areas deemed of national significance by the U.S. Congress, bring together citizens, scientists, businesses and government officials to solve environmental problems and promote healthy, vibrant communities using a consensus-based approach. The stakeholders of each program voluntarily work in partnership to identify important coastal resources and develop and implement action plans to ensure long-term ecosystem and economic viability. The partners bring to the table a mutual concern for the health of the watersheds, along with management, scientific, economic and public communication expertise. This collaboration enables the NEPs to not only address long-term issues but also respond rapidly to emergency situations, such as the Deepwater Horizon spill.

Along the Gulf of Mexico coast, there are seven NEPs located in five states: Florida, Alabama, Louisiana and Texas (Fig. 1). When the Deepwater Horizon spill occurred, the Gulf NEPs were able to immediately address the vital need to communicate with their local communities about volunteer opportunities, what actions were being taken to stop and clean up the spill, and what the ecological and economic impacts might be. The NEPs provided important technical assistance to wildlife rehabilitation and protection efforts; furnished baseline data on natural resources to evaluate post-spill impacts; supplied local governments with the means to monitor the progress of the spill along the coast; served as a valuable source of information to the media outlets; and contributed scientific advice to official oil spill responders about the local area and the resources in need of protection. Information about what *not* to do was also shared with the public.

The goal of this paper is to describe how local implementation (the seven NEPs located in the Gulf of Mexico) of a national program (USEPA's NEP) responded to the diverse needs of their communities immediately following a major oil spill, and continue to act as focal points to provide science-based restoration and management support.

## 2. Immediate Response from the Gulf NEPs: case studies

One of the most important functions the NEPs provided to the Gulf Coast communities was to serve as conduits for factual, unbiased information. Federal and state oil response agencies responded to the spill immediately and official statements were issued. The sheer size of the response to the Deep Water Horizon attracted an equally large media response. The media were hungry for more information and interviewed numerous public sources. Unfortunately, some misinformation, particularly about the progress of the spill cleanup and the harmfulness of the technologies being used, was reported and accepted by the public as fact. The NEPs are well-established sources for the media and as a result, were able to share accurate information without the need to "take sides."

In 2010, the University of New Hampshire's Carsey Institute's Community and the Environment in Rural America (CERA) conducted a survey of more than 2000 residents in Louisiana and Florida [10]. Survey respondents reported that the most trusted source of information about the BP spill was scientists, followed by environmental organizations. These relatively high levels of trust in attributes of NEPs (in comparison to newspapers, television, BP and the internet) was reflected in the effectiveness of communication provided by the NEPs during initial days following the spill.

### 2.1. Providing unbiased resources for factual information

In order to provide parish leaders and residents with credible information about the spill, the Barataria-Terrebonne NEP (BTNEP) in Louisiana produced and distributed a series of fact sheets on impacts on the environment, what to do to contain spills and what not to do, what dispersants are, and what their effects are on natural resources and human health. A number of other Gulf NEPs shared these fact sheets with their own communities.

In order to help inform the communities about the complex oil spill response, recovery and restoration activities, the Mobile Bay NEP (MBNEP) in Alabama placed advertisements in the local papers summarizing how its many partners were involved in water quality, living resources, habitat management, human uses and citizen participation aspects of the spill response.

The directors of BTNEP and MBNEP took on the role of front-line media relations, giving presentations and interviews to local, national and international reporters, residents and officials. Presentations included explanations of the Oil Pollution Act and the spill response

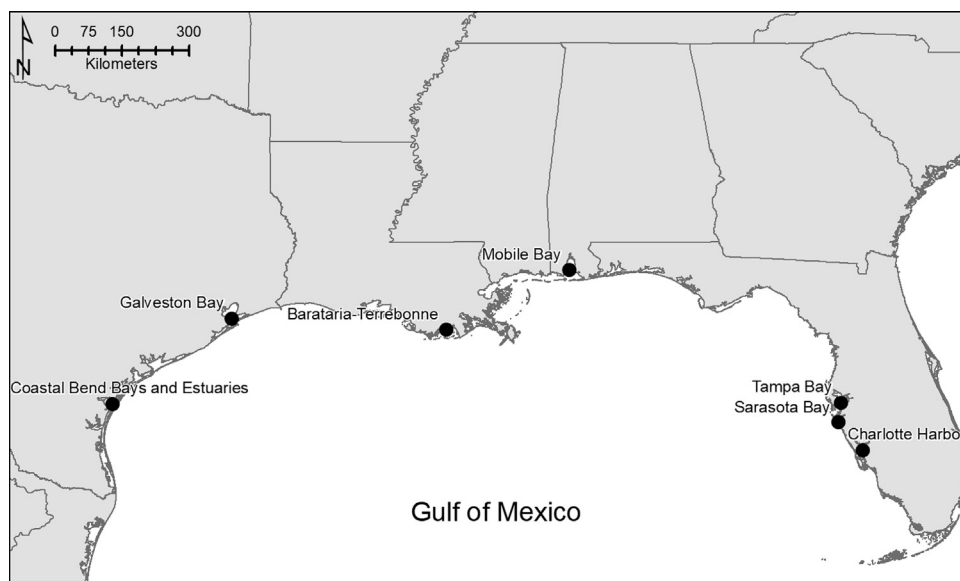


Fig. 1. National Estuary Programs located in the Gulf of Mexico.

process; differences between technological and natural disasters; the chemistry of oil and its impact on natural resources; the impacts of dispersants and when they can and cannot be used; and information about important coastal natural and economic assets.

The Galveston Bay Estuary Program (GBEP), in Houston, Texas, and agency partners kept the Galveston Bay Management Conference Council and its subcommittees informed regarding the spill and recovery. The GBEP's host agency, the Texas Commission on Environmental Quality, is a Texas Trustee for the Natural Resource Damage Assessment, and all information and spill response was coordinated through that program.

## 2.2. Expanding volunteerism and public outreach

All across the Gulf and throughout the U.S., volunteer interest and public engagement was very high. The public outreach staff of the Gulf NEPs participated in joint conference calls, as well as calls with their respective state and local government public information officers, to obtain daily and weekly updates on the status of the spill response and determine the best methods to communicate that information to their communities. The NEPs maintained up-to-date information on their websites and on Facebook to reach as broad an audience as possible. They traveled to meetings with the federal and BP officials responsible for the spill response activities to learn firsthand about the status of the spill cleanup. The Gulf NEPs devoted hundreds of man-hours to organizing and hosting meetings with residents, public officials, businesses, fishermen and nongovernmental organizations to provide them with information and to respond to questions and concerns.

In one week alone, the MBNEP received over 7000 calls from volunteers across the nation. In the early stages of the spill, there was no official place responsible for accepting and responding to these calls. In efforts to fill this role, the MBNEP set up a system on Facebook, which was continuously updated, to log-in volunteer offers. The program was able to fill an important gap until other organizations and the state of Alabama could take over volunteer coordination and monitoring.

The BTNEP used its strong volunteer system to galvanize relief efforts. A trailer was set up near the spill impact areas as a base of operation. Staff members were sent to guide receipt of the massive donations from around the nation of cleanup materials, such as paper towels, cameras, gloves and soap. Staff members were sent to Grand Isle to help agencies that were not set up to receive donated materials. The BTNEP posted on its website a list of items that were needed. Many citizens were concerned about the safety of sea turtle and shorebird nests that could have been inadvertently destroyed by response workers on beaches, particularly from All Terrain Vehicle traffic. The oil spill occurred during peak nesting season, heightening the danger to these important wildlife species. With the help of volunteers, the BTNEP cordoned off and protected these nesting areas. The BTNEP also sent staff to the Audubon Institute to assist with turtle rehabilitation.

Another noteworthy contribution of the BTNEP was their dedicated outreach to school children during the Deepwater Horizon spill event. This was a frightening time for the children who did not understand what was going on, how long it would last, how devastating it would be and how their families' livelihoods and safety would be affected. Many of the children came from families in the fishing business, others working in the oil industry. This led to conflicted feelings and depression, especially compounded by misinformation feeding the communities' fears and anger. The BTNEP Education Coordinator offered to come to the schools to talk to the students and provide them with accurate, understandable information about spill. She presented age-appropriate slide shows about the oil spill and information about the properties of oil, how it was formed, and its beneficial uses and problems. She took the approach that the spill was an accident and did not cast blame, which was important to alleviate the stress of students. By the BTNEP staff providing factual information and by listening to their questions and concerns, the students were comforted that this was not

“the end of the world.” After the slide show presentation, hands-on activities were provided so that the students could learn about oil, its properties and cleanup techniques. Scenarios were also played out that helped the students understand what the oil spill responders were experiencing in high heat and heavy protective suits. She also shared the turtle rehabilitation program with the schools, which really engaged the students.

Shortly after the incident the Sarasota Bay Estuary Program (SBEP) in Florida hosted two public forums in concert with emergency management officials from the region to inform the public on risks from the spill. The forums were well attended and an email communication network was established to brief the public on a daily basis. SBEP and the Tampa Bay Estuary Program (TBEP) were involved in tracking the status of the spill via the Coast Guard Base Command Center in Tampa and remained in direct communication with federal, state and local officials.

Additionally, the Charlotte Harbor NEP (CHNEP) co-hosted a full-day regional workshop in October 2012 with the Environmental Law Institute to help explain the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act (RESTORE Act) and its implementation in Florida. CHNEP staff did numerous presentations throughout its 4700 square mile service area to ensure that the public knew and understood what happened with the spill and the response efforts that were underway to protect Southwest Florida's coastal waters. The NEPs engaging volunteers, employing public outreach and providing factual information in Gulf communities was critical to their effective engagement in response to the spill's deleterious effects on the Gulf of Mexico.

## 2.3. Providing reliable scientific and technical expertise

In addition to providing leadership in providing crucial, factual information to the Gulf communities, the NEPs provided scientific and technical knowledge that is useful in responding to emergency situations. NEP staff scientists assisted in activities to clean and rehabilitate sea turtles, birds and other wildlife harmed by the oil.

Intimate knowledge of the areas allowed the BTNEP director to serve as a resource to the spill response officials on the location of critical natural resources that should be protected, and where to place booms to contain the oil. Having been involved in other oil spill response events, the director was able to share results of a study he conducted on the best methods to remove oil from marshes to ensure optimum restoration. At the time of the spill, BTNEP was undertaking a bird survey along the Louisiana coastline with many participants. They continued the survey and were able to obtain important data about oiled birds.

In Texas, the Coastal Bend and Bays Estuary Program (CBBEP) Coastal Bird Program also participated in post spill studies and was able to provide estimates of migratory shorebirds affected by oil in South Texas. This information was useful to the Natural Resource Damage Assessment process, providing data on impacts to birds from the spill.

In order to help the local, parish governments monitor and record the progress of the oil spill, BTNEP purchased eight GPS cameras to give to parish staff to use in oil spill flyovers to photograph and obtain GPS coordinates and dates while tracking the spill. Similarly, the chief scientist with the SBEP in Florida worked with the NEP research partner, Mote Marine Laboratory, to obtain baseline data, which could be used to compare impacts if oil came ashore and evaluate possible future effects from dispersants.

Although Tampa Bay, FL was not directly impacted by the oil spill, it had dealt with a potential hazardous spill from a defunct phosphate processing plant. In the face of unanticipated high rainfall, ammonia-laden process water threatened to breach containment berms and spill into Tampa Bay, and officials scrambled to determine how to avoid a disaster. The Tampa Bay Estuary Program (TBEP) used its existing network of policy makers, technical experts and citizens to help address

the problem. The TBEP Technical Advisory Committee was convened to advise the state decision makers on disposal options. TBEP experts helped design a state and local monitoring program to evaluate the impacts from the controlled release of the discharge, and local governments and agencies implemented an intensive monitoring program in the bay and nearshore waters. The TBEP Citizen's Advisory Committee hosted a televised public forum with public officials, mining industry and science experts to keep citizens informed about the status of the situation.

### 3. Long-term assistance in Gulf of Mexico recovery: case studies

In October 2010, President Obama created the Gulf Coast Ecosystem Restoration Task Force, which was charged to develop a long-term restoration strategy to address impacts from the oil spill and other factors contributing to the decline of the Gulf of Mexico coast. The Task Force worked Gulf-wide with the local communities, governments and tribes to obtain their thoughts and perspectives in order to develop an effective strategy. The Gulf NEPs were instrumental in this outreach effort by hosting local public forums for community members to directly provide the Task Force members with ideas on priority issues, existing impediments and key actions for the restoration of the Gulf ecosystem. The strategy is being used to identify priority projects to restore the Gulf from impacts caused by the Deepwater Horizon oil spill [1].

In Southwest Florida, for example, the TBEP, SBEP and CHNEP – the Florida Gulf coast programs – worked collaboratively to identify and compile restoration projects with descriptions into a Southwest Florida Regional Ecosystem Restoration Plan [9]. Over 50 local governments, agencies and non-governmental organizations worked collaboratively to develop a prioritized list of projects and programs which will restore and protect the Gulf Coast natural resources throughout the region. This report and project list was submitted to the Gulf Coast Ecosystem Restoration Council in March 2013, and was used to populate a Florida Department of Environmental Protection portal that allowed the public to view and input projects and updates. Having this consolidated and prioritized list that was vetted and supported by diverse NEP partners ensures that restoration dollars can be readily allocated for timely restoration.

Other Gulf NEPs are participating in state and federal recovery efforts within their watersheds. The GBEP continues to provide a forum to convene Galveston Bay estuary stakeholders and partner agencies through the Galveston Bay Council (Management Conference) and its subcommittees. While the GBEP is not eligible to apply for RESTORE funding, due to its position within the Texas Commission on Environmental Quality which is the Texas agency charged with dispersing and overseeing the RESTORE funds in Texas, many regional partners and projects have been initiated in Galveston Bay post-spill. It is in part due to the regular convening of partners in the region through the GBEP that so many successful collaborative projects have been awarded funding.

The CHNEP has provided technical support for RESTORE projects such as conducting water quality testing to help demonstrate the need to convert septic systems to centralized sewers in Southwest Florida coastal communities, which reduces nutrient loading into the Gulf of Mexico. It has also helped fund the post-restoration monitoring of the Coral Creek project in the DEP RESTORE Act portal. The CHNEP also served as a member on the Charlotte and Lee County RESTORE Act committees, which helped to develop those counties' Multi-year Implementation Plans for Treasury Department funding of Gulf restoration projects. These NEP activities to provide reliable scientific and technical expertise increase the robustness and efficacy of Gulf restoration efforts.

Four early restoration projects were identified for funding within the Barataria-Terrebonne National Estuary Program area boundaries which covers the land between the Mississippi and Atchafalaya rivers. The projects included: the Jean Lafitte Canal Backfilling, the West

Grand Terre Beach Nourishment and Stabilization, the Lowermost Mississippi River Management, and the Bayou Dularge Ridge, Marsh, and Hydrologic Restoration.

In Texas, CBBEP has received two National Fish and Wildlife Foundation (NFWF) Gulf Environmental Benefit Fund awards totaling \$2732,000 for restoration efforts. The Nueces Bay Rookery Islands Project (\$1145,000) will restore and protect over 3 acres of important colonial water bird nesting habitat on three rookery islands in Nueces Bay, which is projected to support hundreds of additional pairs of wading birds and ground-nesting birds each year [7]. The Egery Flats Restoration Project (\$1587,000) will restore hydrology and reduce salinity to enhance over 600 acres of emergent marsh, submerged aquatic vegetation, and tidal flats [8].

In Alabama, MBNEP received grants from National Fish and Wildlife Foundation Gulf Environmental Benefit Fund to develop eight comprehensive watershed plans, which NFWF uses to help inform subsequent project funding decisions. To date all eight planning efforts are in development with four plans already published. Projects undertaken as a result of this planning include shoreline stabilization, acquisition, and trail development. Leveraging the NFWF grant, funding for watershed management plans for all other tidally influenced watershed/watershed complexes was awarded through the Federal RESTORE Council and the State of Alabama. As MBNEP continues to produce these plans and the project list included within them, it has become clear the watershed approach to coastal restoration is creating a return on investment to communities in terms of oil spill dollars and, more important, in terms of partnerships developed to implement projects with high community support and based on scientific assessment of need.

In the Tampa Bay watershed, implementation of five priority TBEP restoration elements approved by the RESTORE Council are expected to result in approximately 664 acres of coastal habitat restored or enhanced and 200 acres of seagrass enhanced or created. Habitat restoration activities include exotics removal; tidal exchange restoration; and sheet flow restoration. Additionally, an estimated 8480 t of greenhouse gas (GHG) emissions per year would be reduced, providing added climate change resiliency. GHG emissions reductions result from switching from fuel to biogas for municipal vehicles. Habitat restored, enhanced or created include: 200 acres of seagrass, 14 acres of coastal uplands, 650 acres of coastal wetlands, and 1.8 acres of freshwater wetlands.

The Sarasota Bay NEP continues to restore valuable habitats important to fisheries in the Gulf of Mexico: seagrasses, wetlands, artificial reefs and oyster reefs. Recent monitoring of the artificial reefs in Sarasota Bay indicate high numbers of juvenile gag grouper; these reefs are specifically designed as staging areas for offshore Gulf fishery. The SBEP in concert with the Charlotte Harbor and Tampa Bay NEPs are also conducting the first comprehensive assessment of tidal creeks in Florida. The work is being conducted in cooperation with the local governments along the southwest and central coast. The tidal creeks have been found to contain large numbers of juvenile common snook, red drum, tarpon, and valued forage species important to the Gulf of Mexico. The SBEP in concert with Sarasota County is exploring creek restoration within the hundreds of miles of drainage ditches created during the 1920s and 1930s to drain historic sawgrass marsh. These deep ditches are now the post-development stormwater conveyance systems to the tidal creeks. New research suggests these trapezoidal ditches can be improved by creating sinuosity, with ripples and pools at the base. The planting of the ditches with native species can remove nitrogen and phosphorous; create valued fishery habitat; maintain conveyance; and reduce erosion and sedimentation in the creeks.

The CHNEP has directly undertaken oyster habitat restoration and seagrass planting in Gulf estuaries, which increase the overall ecological health and resiliency of the Gulf of Mexico. The oyster habitat project has in the last year recruited hundreds of thousands of oysters, each which can filter up to 50 gallons a day and which provide

important aquatic habitat for numerous Gulf species. The seagrass gardening project in the Caloosahatchee estuary is restoring a seed source where it has been lost; allowing the seagrass to recover and restore the important aquatic habitat they provide as well. Even though oil never touched the shores of these Southwest Florida estuaries, the water quality and fisheries have been greatly impacted by the spill. These restoration activities provide vital long-term assistance in Gulf of Mexico recovery.

#### 4. Lessons learned: what could have been done more effectively or differently? What information was needed that was not available?

Based on the experiences of the Gulf NEPs to the 2010 Deepwater Horizon oil spill, key elements necessary for effective and efficient response included those needed for immediate response efforts, and those necessary for longer-term assessment and recovery. To help meet the immediate needs of the coastal communities, three general requirements were identified: 1) an emergency/disaster management plan or checklist with systematic application of available resources such as a list of partner organizations, equipment and personnel; 2) more effective use of social media to share information about safety, volunteer opportunities, and paid opportunities for fishers out of work; and 3) enhanced communication and information sharing between federal, state and local agencies and the public.

To assess efforts needed for longer-term ecological recovery, information needs included 1) baseline monitoring of water quality, seagrass, benthic and shoreline conditions prior to the event, so the level of impact could be more accurately assessed; 2) better scientific understanding of the linkage between estuaries and Gulf resources, including fisheries; and 3) a comprehensive understanding of restoration needs of each area, with projects designed and permitted for efficient and effective use of recovery funds.

These needs are equally applicable for effective response and recovery efforts from natural or manmade severe events. The Gulf NEPs are working with our local, state and federal partners to address the shortcomings identified from the Deepwater Horizon spill and become more prepared to respond effectively to current and future events.

#### 5. Discussion and conclusions

A recent assessment of attributes of successful actions to restore environmental conditions found that attributes most associated with achieving restoration goals included 1) leadership by a dedicated watershed management agency; and 2) governance through a bottom-up collaborative process [3]. Two NEPs, including TBEP, were identified by Gross and Hagy as examples of locally-organized watershed management programs where nutrient reduction strategies had resulted in meeting restoration goals. A principle common to each of the successful efforts was dedicated leadership by a coordinating entity with active participation by technically skilled staff, providing watershed management at the local level with participation and support from higher-level (including federal) government agencies [2,4,5]. These same attributes have also allowed the Gulf NEPs to play primary roles in providing trusted communication, scientific expertise and implementation of restoration projects following natural or man-made disasters in the communities where they are located.

As the nation was riveted by the Deepwater Horizon oil spill and the

government and oil industry officials were responding to the spill, the NEPs of the Gulf of Mexico effectively took a lead role in providing credible, factual information to their communities and important technical expertise to spill responders about the local environment. The comprehensive community networks of the NEPs enabled the programs to step into these roles immediately. Whether it was meeting with community members or families who had directly experienced the explosion or with local resource agency personnel or residents who were assisting with cleanup, the NEP staff across the Gulf provided a science-based, cooperative, people oriented safety net. The Gulf NEPs' unbiased outreach approach to providing information not otherwise available to them helped community leaders and residents focus on the work at hand to respond to the spill, restore damaged resources, reenergize the local economy and normalize their lives. The Gulf NEPs are continuing to assist in recovery of the Gulf of Mexico through projects and programs providing habitat restoration, water quality improvement and education at the local and regional level. The ongoing role of NEPs to build consensus in the face of environmental disasters will continue to be the strength of the program.

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