



# Implementing Endangered Species Act (ESA) Section 7 (a)(1) Conservation Planning During US Army Corps of Engineers (USACE) Coastal Engineering Projects

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**PURPOSE:** This technical note was developed by the US Army Engineer Research and Development Center–Environmental Laboratory (ERDC-EL) to provide guidance to the US Army Corps of Engineers (USACE) on implementing Endangered Species Act\* (ESA) Section 7(a)(1) conservation planning, in coordination with the US Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) during coastal engineering projects. USACE expends ~\$200–\$300 million each year on compliance, conservation, and other activities associated with the ESA (USACE 2022), and these expenditures often exceed those of other federal agencies (for example, US Bureau of Land Management) that have jurisdiction over far greater land holdings than USACE. To streamline the ESA compliance process, lower costs, and generate more positive outcomes for federally listed threatened and endangered species (TES), USACE was directed in June 2015 by the Deputy Commanding General (DCG) for Civil and Emergency Operations to proactively identify and incorporate conservation benefits into all projects when and where opportunities arise, under the authority of Section 7(a)(1) of the ESA (USACE 2015). The DCG identified Section 7(a)(1) conservation planning as a mechanism to efficiently achieve project purposes, create environmental value, and streamline the ESA Section 7(a)(2) consultation process.

Perhaps nowhere else in the USACE mission objectives are environmental impacts more directly felt and observable than coastal engineering projects. USACE is responsible for the construction, enhancement, and maintenance of our nation’s coastal infrastructure, which includes the operation

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\* Endangered Species Act of 1973, 16 U.S.C. 35 § 1531 et seq. (2019). <https://www.govinfo.gov/content/pkg/USCODE-2019-title16/pdf/USCODE-2019-title16-chap35.pdf>.

of ports and harbors; shoreline stabilization to protect suburban, urban and industrial areas; management and operations of confined disposal facilities (CDFs), and the maintenance of the Intracoastal Waterway System (ICWW) (<https://www.usace.army.mil/Missions/Civil-Works/Navigation/>; EPA and USACE 2007; Guilfoyle et al. 2019). Coastal engineering projects have the potential to create or enhance habitats for endangered, threatened, or at-risk shoreline-dependent species (for example, sea turtles and shorebirds) through beach nourishment (Dickerson et al. 2007; Reine 2022), coastal shoreline restoration (Bridges et al. 2015), Engineering With Nature® (EWN) projects (Banks et al. 2013; Banks and Smith 2013, Bridges et al. 2018), and management of CDFs (Guilfoyle, Calver, and Jackson et al. 2020; Guilfoyle, Calver, and Richards et al. 2020). Opportunities also exist to avoid or minimize adverse impacts through identification and incorporation of best management practices (BMPs) during coastal engineering projects (Figure 1) (Guilfoyle et al. 2019). Unfortunately, little experience or guidance currently exists on when and how to develop and implement project or programmatic ESA conservation programs or initiate the Section 7(a)(1) planning process. In addition, some USACE divisions and districts may be hesitant to implement conservation planning because of a lack of familiarity with the process and a lack of clear guidance, along with a sense that Section 7(a)(1) is an unfunded mandate. We require a paradigm shift in policy and planning of ESA compliance by redirecting Section 7(a)(2) budgets towards Section 7(a)(1) conservation planning efforts whenever possible.



Figure 1. Coastal engineering actions that create intertidal shoals have the potential to provide important foraging habitat for shorebirds during the breeding and nonbreeding seasons. (Photo Credit: Walker Golder, North Carolina Coastal Land Trust)

This technical note seeks to (1) briefly introduce the history and benefits of ESA Section 7(a)(1) conservation planning within USACE and its potential application during coastal engineering projects; (2) outline a process for USACE divisions and districts to implement Section 7(a)(1)

conservation planning to meet or exceed ESA compliance while meeting mission objectives; (3) detail how collaborations between USACE and other federal agencies, state agencies, universities, and nongovernmental organizations (NGOs) can promote cost-effective approaches to conservation; and (4) demonstrate how this approach promotes good ethical and environmental stewardship by providing tangible benefits to federal and state listed species and other sensitive, rare, or species-at-risk and their habitats.

**Background and history of ESA Section 7(a)(1) planning within the US Army Corps of Engineers (USACE).** USACE, as well as other federal action agencies, are intimately familiar with the Section 7(a)(2) process that requires federal actions to avoid jeopardizing the existence of ESA-listed species or adversely modifying ESA-listed species' critical habitat. When federal agencies undertake an action that may affect a federally listed species or designated or proposed critical habitat, they are required under the ESA to complete and submit a biological assessment (BA) to the USFWS. When a federal agency determines, through the BA process, that its action is likely to adversely affect a listed species, the agency submits to the USFWS a request for formal consultation under ESA Section 7(a)(2). The USFWS then prepares a biological opinion (BiOp) that states whether the agency has ensured its actions are not likely to jeopardize the continued existence of a listed species or result in destruction or adverse modification of critical habitat. In a jeopardy decision, the USFWS may issue a BiOp that mandates a federal, state, or corporate organization comply with specific actions to ensure survival of a listed population and protection of critical habitat. Depending on the situation, BiOps may be costly, impose project restrictions, mandate habitat restoration efforts with questionable value to target species, or delay the agency's ability to meet mission objectives or deadlines.

Long recognized by legal scholars as a missing link in the federal consultation process (for example, Ruhl 1995; Li 2017), Section 7(a)(1) consultation has recently been used in three USACE divisions to reduce project costs and conflicts, maximize conservation benefits, and facilitate Section 7(a)(2) consultations while also achieving substantial improvements in listed species population or habitat baselines, or both (Killgore et al. 2014; USFWS–Southeast Region 2018; USFWS–Southeast Region 2019; USACE–Northwest Division 2017). This effort began as an informal process between the Mississippi Valley Division (MVD) and USFWS to use channel-engineering techniques under the Channel Improvement Program (CIP) to conserve and improve habitats and reduce impacts to endangered species within the lower Mississippi River. Following a decade of implementation, data collection, testing, and modification, the effort was formally adopted and recognized under a USACE-MVD conservation plan and through Section 7(a)(1) consultation with the USFWS (Killgore et al. 2014). This effort employs ecological engineering actions during routine maintenance or through design of new construction projects to modify and locate river-training structures that maintain or restore secondary channels, increase river-channel habitat complexity, and reduce direct impacts to listed species occupying the lower Mississippi River navigation channel, including the interior least tern (*Sternula antillarum athalassos*), piping plover (*Charadrius melodus*), and pallid sturgeon (*Scaphirhynchus albus*).

A few years later, USACE–Southwestern Division (SWD; USFWS–Southeast Region 2018) took a similar approach to formalize programmatic actions to conserve the interior least tern within jurisdictional waters of the Southern Plains. Subsequently, USACE–Northwestern Division (NWD; USACE–Northwestern Division 2017) used the Section 7(a)(1) planning process under a BA for the

Missouri River mainstem and associated tributary projects to promote conservation of the tern, piping plover, and pallid sturgeon as well as the gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), and northern long-eared bat (*Myotis septentrionalis*). Following formal consultation under Section 7(a)(2) for this BA and its conservation components, the USFWS replaced a 17-year standing jeopardy BiOp with a nonjeopardy opinion for the interior least tern, piping plover, and pallid sturgeon (Hartfield et al. 2017).

These three Section 7(a)(1) conservation programs and associated commitments by USACE have since been credited as the primary factor in the delisting of the endangered interior least tern,\* conservation of the endangered fat pocketbook mussel (*Potamilus capax*) (USFWS–Southeast Region 2019), and the increase of the baseline of spawning and rearing habitat for the pallid sturgeon (Killgore et al. 2014). Most recently, a USACE–Memphis District (MVM) Section 7(a)(1) conservation plan for the fat pocketbook mussel was developed and implemented (Killgore et al. 2014), which, along with the MVD Mississippi River Program, led to a recommendation to delist this mussel because of its subsequent recovery (USFWS–Southeast Region 2019). On the basis of these and other examples, the recognition by USACE headquarters (USACE 2015) supports the potential value of Section 7(a)(1) implementation to reduce ESA compliance costs and conflicts across USACE programs. The USFWS's Endangered Species website (<https://www.fws.gov/program/endangered-species>) provides more information on the history, purpose, benefits, and practical examples of ESA Section 7(a)(1) implementation (<https://www.fws.gov/service/esa-section-7-consultation>).

**Summary of ESA Section 7(a)(1) conservation planning benefits.** In brief, Section 7(a)(1) conservation is proactive, and can give the action agency more control and flexibility over how it sets priorities and implements conservation actions for listed species' recovery. Proactive conservation incorporated into USACE projects allows the agency to consider improved species habitat or population baselines, or both, beyond a specific action area—or even beyond the program footprint (Hartfield et al. 2017; Li 2017). The critical benefits accrue to USACE by providing the agency cost-effective opportunities to compensate for impacts from past, ongoing, and future actions through demonstrable benefits to listed species baselines via increased population metrics or increased or enhanced habitat availability (Hartfield et al. 2017; Li 2017). Any derived programmatic actions or net benefits must also be fully considered during future project- or program-level Section 7(a)(2) consultations. For example, projects operating under a conservation plan, which demonstrates a net benefit to a listed species habitat or an increase in a listed species population baseline, should never trigger a jeopardy determination for that species. Additionally, components of future BiOps, such as terms and conditions or reasonable and prudent measures, can be derived from BMPs as well as monitoring methods and schedules already planned and implemented by USACE. Moreover, advanced internal planning through Section 7(a)(1) can greatly reduce Section 7(a)(2) consultation conflicts and delays, promote greater interagency and stakeholder collaborations, and permit the sharing of resources and costs across USACE divisions and districts. For example, early efforts to implement conservation actions for interior least tern in MVM also benefited the Vicksburg District by improving the species habitat baseline in the lower Mississippi River. Similarly, growing numbers of terns within the lower

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\* “Endangered and Threatened Wildlife and Plants; Removal of the Interior Least Tern From the Federal List of Endangered and Threatened Wildlife.” 86 Fed. Reg. 2654–81 (January 13, 2021) (amending 50 C.F.R. § 17.11(h)). <https://www.govinfo.gov/content/pkg/FR-2021-01-13/pdf/FR-2021-01-13.pdf>.

Mississippi River subpopulation managed by MVD increased the range-wide population baseline, which ultimately benefited SWD and NWD.

Section 7(a)(1) conservation planning may be initiated from the bottom up or top down, internally or in collaboration with other federal agencies. It creates a process for other collaborators and stakeholders, including non-government organizations (NGOs), to provide direct assistance to USACE conservation efforts. For example, early conservation efforts within MVD and the lower Mississippi River began as a collaborative planning effort between MVM, the Lower Mississippi River Conservation Committee (LMRCC), and USFWS to restore or maintain flows within secondary channels for endangered species (for example, by notching closed dikes to restore flow during periods of low water) as well as for fisheries and recreation. At little to no additional cost to the district and as opportunities allowed during scheduled routine maintenance, the project modified existing dike fields or incorporated them into new construction planning and design. The agencies and NGOs later identified areas of high impact and need not scheduled for construction or maintenance, and together they established a process for design by MVM engineers, funding by USFWS, and construction by the NGO with oversight by MVM. As benefits became evident, MVD division command expanded the district collaboration to all MVD districts and field offices in coordination with USFWS. NGOs such as the LMRCC and The Nature Conservancy (TNC) now cost share such projects throughout the lower Mississippi River.

Implementing Section 7(a)(1) planning can significantly improve conservation outcomes for listed species, minimize the likelihood that other rare or sensitive species will become listed, and reduce the environmental-compliance costs of USACE programs. Through the development and implementation of a proactive conservation plan, USACE inland waterway engineering projects have used the CIP program to become the primary mechanism for the conservation of multiple channel-dependent listed species within the lower Mississippi River. The implementation of ecological engineering to design and notch dikes is now part of the standard operating procedures (SOPs), where the USACE now appraises every project for conservation potential. We believe that Section 7(a)(1) conservation planning can provide similar opportunities for USACE divisions and districts in coastal regions to improve conservation outcomes for multiple federal- and state-listed coastal species. USACE coastal projects can incorporate ecological engineering in many contexts that can benefit species both on- and offshore. Therefore, either or both USFWS and NMFS (hereafter referred to as *the Services*) will need to be involved in planning and consultation. Already, existing efforts by USACE in coastal areas to build and maintain dredged-material islands, deploy artificial reefs that reduce wave actions while also attracting and sustaining populations of invertebrates to benefit fish, and construct beaches through beach-nourishment projects designed and managed according to specific parameters to facilitate nesting by marine turtles (Reine 2022) all benefit habitat and population baselines for multiple listed species and could be included in future Section 7(a)(1) conservation planning efforts.

**Initiating and implementing Section 7(a)(1) conservation planning during USACE coastal engineering projects.** Although interagency cooperation for recovery was the primary intent of Section 7 when the ESA was first drafted (USFWS–Southeast Region 2018), subsequent amendments and agency cultures have devolved to focus interagency relations on Section 7(a)(2) and jeopardy avoidance. Because of this history and the small number of examples of interagency conservation success, initiating and implementing planning will first require an internal USACE

consensus at the level of the initiative (that is, division, district, or both) towards the understanding, approach, and goals of any Section 7(a)(1) conservation program. After reaching this internal consensus, USACE will require a sustained process for interagency contact and coordination with the Services to negotiate, design, and consult on any final plan or program. Achieving both internal and external consensus will require time and patience but minimal commitment of resources. To succeed, the conservation design and strategy must have the complete support of both USACE and the Services, and the agencies must fully understand and accept their respective roles. USACE serves as the authority on project and program strategy, design, and execution—including how, where, when, and to what extent actions may be modified to provide conservation opportunities and benefits. USACE, and other federal agencies, may need to determine the presence, distribution, and ecological relationships of TES on lands within their jurisdiction before conservation planning can begin. The Services serve as the authority on biology, ecology, and habitats of the species and bring insight on the responses of species to proposed strategies and actions. The Services must completely accept that some components will be discretionary, based on funding and opportunities (for example, levels of research and monitoring), whereas USACE must clearly commit to pursuing budgets, authorization, and opportunities that allow implementation of discretionary actions. Planning and initiating a Section 7(a)(1) conservation strategy and design should include the following considerations:

1. Section 7(a)(1) conservation planning is a requirement of the ESA for all federal action agencies, and Section 7(a)(1) programs must have a visible and significant potential to benefit the listed species with little to no effect on the specific USACE coastal missions or programs.
2. The strategy should incorporate TES considerations into routine coastal engineering program policy and planning, actions and operations, and regulatory practices to achieve and demonstrate a net gain in listed species population or habitat baselines, or both.
3. Negative impacts to listed species or their habitats by some actions and in some areas should be offset by other actions or in other areas.
4. After identifying a target species, a draft conservation plan should be internally outlined that addresses the possible adverse effects of any coastal engineering program or specific project as well as potential conservation actions and opportunities within areas covered under the agency's authorities. Sources for actions may include species recovery plans, previous BiOps, EWN projects, CDF management and operations, and coastal engineering and restoration efforts. One size does not fit all. Creativity and flexibility are essential to the successful development and implementation of conservation plans.
5. Once program goals and a conservation plan have been internally outlined, initiate discussions with appropriate Services personnel. Any final Section 7(a)(1) conservation program must be thoroughly reviewed in cooperation and consultation with the Services.
6. The Services' primary role under Section 7(a)(1) is to encourage, assist, and support USACE in developing and implementing conservation programs and plans. While USACE may identify conservation actions outside of the action area, the Services will not ask the agency to reach beyond its authority, consistent with their supplemental obligations under the ESA.

7. Section 7(a)(1) consultation is a continuous process of effective and transparent communication at all levels of management through review and feedback, thus providing for a strong adaptive management component of conservation program execution.
8. Section 7(a)(1) conservation programs and plans do not, and were not intended to, take the place of Section 7(a)(2) consultations; however, they should assist in complementing, streamlining, and facilitating Section 7(a)(2) consultations.
9. Section 7(a)(1) program planning and consultation can provide a powerful nexus for initiating meaningful partnerships with other federal agencies, as well as with states, local municipalities, institutes of higher learning, and NGOs.
10. USACE will need to implement a monitoring and adaptive management program, likely in collaboration with other stakeholders, to ensure that conservation measures result in intended recovery goals for populations of targeted species and/or their habitats.

**The importance of stakeholder collaboration in Section 7(a)(1) conservation planning during USACE coastal engineering.** A central feature of Section 7(a)(1) conservation planning is the potential of interagency cooperation in developing and implementing conservation actions. Under Section 7 of the ESA, all federal agencies are required to use their authorities to conserve listed species. Some federal agencies may achieve Section 7 compliance through participation in specific collaborative projects, such as pre- and post-project monitoring (for example, the USFWS or the US Geological Survey [USGS]), while others may assist with actions such as predator control to protect breeding or nonbreeding populations of listed species (for example, the US Department of Agriculture [USDA]–Wildlife Services). Federal research facilities, such as ERDC-EL, can facilitate efforts to monitor, implement engineering solutions, and adapt to changing conditions to improve population and habitat baselines of targeted species during federal operations. As opportunities arise and willing partners coalesce under mutual interests to protect and conserve listed species and their habitats, stakeholder collaborations may also include initiatives and resource leveraging with state and local municipalities, universities and colleges, and NGOs.

Collaborating with state and local interests to conserve state-listed species and other regionally identified species of concern will not yield specific benefits directly under ESA Section 7(a)(1) conservation planning. However, these collaborations are not only necessary to comply with state and local laws and regulations but also critical to the formation of relationships built on trust and mutual cooperation. In addition, efforts to protect state-listed species and regionally identified species of concern can promote proactive actions that may yield significant dividends in the future either by reducing the probability of these species becoming federally listed or by contributing to formation of a recovery team and a viable conservation program should they become listed.

Numerous NGOs possess significant expertise in monitoring and assessing the impacts of human-induced environmental changes on wildlife populations. For example, the National Audubon Society provides access to significant numbers of experienced volunteers who can assist performing pre- and post-project bird surveys to help determine the effects of those projects on individuals or groups of species. Similarly, TNC can help collect pre- and post-project ecological data or help with management plans for local areas, or both. Many national, regional, and statewide

NGOs have significant knowledge and expertise on listed species in the local or regional area and can help plan and implement monitoring and data collection; analyze, summarize, and review results and subsequent conservation plans; and assist with development of adaptive management actions, final reports, and future management guidelines to help conserve species or groups of species.

## **ENVIRONMENTAL ETHICS AND USACE ENVIRONMENTAL OPERATING PRINCIPLES.**

A thing is right when it tends to preserve the integrity, stability,  
and beauty of the biotic community. It is wrong when it tends  
otherwise.

—Aldo Leopold, *A Sand County Almanac* (1970, 262)

Contemporary public viewpoints have shifted away from the early twentieth-century concept that humans are masters of the land and therefore justified to use it as they see fit without regard for the consequences, to the view that humans are stewards of the land and therefore responsible for maintaining the integrity and diversity of the land and the wildlife it supports (Leopold 1970, 1991; Brenner 1996; Laal 2009; Callicott 2018). Currently, most US citizens support environmental laws and regulations that protect our air, water, and natural resources (Anderson 2017)—a stark shift in attitudes from the early twentieth century, when environmental issues were rarely considered (Brenner 1996). *Development of the Land Ethic* by Aldo Leopold (1970, 1991), is recognized as a foundational component in the current interpretation of environmental ethics (Brenner 1986; Laal 2009; Callicott 2018). Simply stated, Leopold’s *Land Ethic* describes and justifies a moral and ethical requirement for human individuals and societies to recognize, respect, and protect the diversity and integrity of natural systems and the wildlife populations such systems support (Leopold 1970, 1991). The American public generally supports this ethical viewpoint, according to overall support for the ESA and other environmental regulations that protect listed species and natural resources (Anderson 2017; Bruskotter et al. 2018). USACE employees, although unelected, are nevertheless public servants who represent their local divisions and districts and must uphold the ethical management of the land under their jurisdiction. However, mission mandates to create, enhance, and maintain coastal infrastructure inevitably conflict with public interests to ensure healthy and viable coastal ecosystems, including the wildlife populations that they support. Public interest in maintaining national and international commerce through the management of ports and harbors and through shoreline stabilization efforts to protect industrial, urban, suburban, and recreational infrastructure often require managers and engineers to stabilize dynamic, shifting coastal ecosystems and replace them with static, unchanging systems. Actions such as maintenance dredging and shoreline stabilization that deepen navigation channels to permit passage of oceanic vessels—as well as dikes, jetties, groins, and seawalls—which alter natural sediment deposition patterns and shift sediment away from channels and shorelines, can significantly reduce the sediment-based habitats, including marshes, mud flats, intertidal shoals, beaches, sand spits, islands and barrier islands, on which shoreline-dependent species rely. Developing integrated ecological and coastal engineering approaches that create, restore, or enhance coastal ecosystem services are in the public interest and can help ensure sustainable populations of the most imperiled

coastal species while also lowering the overall USACE costs of ESA compliance (Guilfoyle et al. 2019).

USACE operates under specific Environmental Operating Principles (EOPs) (<https://www.usace.army.mil/Missions/Environmental/Environmental-Operating-Principles/>) developed to ensure USACE operations incorporate actions that integrate sustainable environmental practices. These principles ensure that USACE fulfills its role and responsibility to act towards environmentally sustainable use, stewardship, and restoration of natural resources while also achieving mission objectives (USACE n.d.). EOPs provide the necessary guidance for USACE divisions, districts, and field offices to engage in mission-critical actions, including the creation, enhancement, and maintenance of the nation's coastal infrastructure, while maintaining compliance with federal and state environmental regulations. ESA Section 7(a)(1) conservation planning therefore supports USACE environmental objectives as stated in the EOPs. Specific EOPs that justify conservation planning according to USACE (n.d.) include (1) proactively considering environmental consequences of USACE activities and acting accordingly; (2) creating mutually supporting economic and environmentally sustainable solutions; (3) meeting corporate responsibility and accountability under the law for activities undertaken by USACE that may impact human and natural environments; (4) leveraging scientific, economic, and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner; and (5) employing an open and transparent process that respects the views of individuals and groups with an interest in USACE activities.

Future efforts by USACE to meet mission objectives, conserve coastal ecosystems, and protect populations of shoreline-dependent species will not be easy. While the benefits of the Section 7(a)(1) conservation-planning process may not be immediately apparent, and short-term cost-saving approaches to ESA compliance may not immediately materialize, better ecological engineering approaches and the creation of collaborative efforts must necessarily build towards long-term goals and objectives. The future long-term sustainability of coastal ecosystems and associated wildlife populations in the conterminous United States will largely depend on the ability of the federal, state, local agencies, and NGOs to ensure resilient coastal infrastructure while preserving coastal ecosystem integrity. The critical measure of success for conservation of coastal ecosystems through interagency cooperation under Section 7(a)(1) conservation planning will be the demonstrable success and sustainability of coastal shoreline-dependent species and their habitats.

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