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ENGINEERING WITH NATURE

Threatened and Endangered Species Team Approach USACE Southeastern Region Opportunity Assessment Working Meeting

Advancing Cost-Efficient & Effective ESA Compliance & Mission Sustainability Through Engineering With Nature & ESA Section 7(a)(1) Conservation Plans

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PURPOSE: This document summarizes the major activities and findings of a U.S. Army Corps of Engineers (USACE) working meeting entitled "Threatened and Endangered Species Team Approach - USACE Southeastern Region Opportunity Assessment Working Meeting: Advancing Cost-Efficient and Effective Endangered Species Act (ESA) Compliance & Mission Sustainability through Engineering With Nature (EWN) and ESA Section 7(a)(1) Conservation Plans." The facilitated working meeting was held 3–4 September 2014 and was hosted by Ms. Susan Whittington and Mr. Dylan Davis of the USACE, South Atlantic Division in Atlanta, Georgia.

The USACE Threatened and Endangered Species Team (TEST) and U.S. Fish and Wildlife Service Region 4 (USFWS) cooperatively supported the organization of the meeting towards the overarching goal of advancing a strategic and more systematic approach to ESA compliance and mission execution in a manner that simultaneously produces benefits for species, increases operational flexibility, and results in long-term cost and time savings. The USACE TEST initiatives are coordinated by the U.S. Army Engineer Research and Development Center (ERDC) and are sponsored by the USACE Dredging Operations Environmental Research (DOER) program.

The 30 meeting participants included representatives from USACE Headquarters, USACE Operations and Planning in three Divisions (South Atlantic, Mississippi Valley, Southwest) and seven Districts from the southeastern U.S. (Charleston, Savannah, Jacksonville, Mobile, Nashville, Memphis, and Galveston), ERDC, and USFWS Region 4 Headquarters and Field Offices. The working meeting included technical presentations, group breakout sessions, and facilitated discussions on a broad range of topics associated with USACE and USFWS threatened and endangered species (TES) achievements and challenges, employing ESA Section 7(a)(1), and the opportunities for EWN and ESA Section 7(a)(1) to advance the USACE approach.

BACKGROUND OF ESA SECTION 7(a)(1) FOCUS, TEST AND EWN

ESA Section 7(a)(1) Focus. ESA Section 7(a)(1) states: *"All...Federal agencies shall, in consultation with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species..."* This ESA Section labeled "Interagency Cooperation" (50 CFR 402.01) has rarely been formally and jointly employed by USACE and USFWS. Recently, USACE and

the USFWS finalized a Section 7(a)(1) Conservation Plan for three species (interior least tern (ILT), pallid sturgeon, fat pocketbook mussel) in the Lower Mississippi River (LMR) that incorporates principles and practices consistent with EWN (Killgore et al. 2014). This approach contributed significantly to the Mississippi Valley Division's receipt of a non-jeopardy, Biological Opinion (under ESA Section 7(a)(2)) for its Channel Improvement Program in the LMR. The return on investment, in this case, is estimated at more than five to one, resulting primarily from up-front robust investment in critical research and monitoring that will lead to reduced costs of long-term operation and maintenance activities related to listed species. In addition, highly collaborative monitoring and technical modeling, in combination with conservation measures for the ILT, have contributed to a recommendation by the USFWS to delist due to recovery. The benefits of these achievements, and the related EWN and ESA Section 7(a)(1) approaches to TES conservation, have gained attention and interest at the highest levels of the USFWS, USACE, and other federal agencies. The approach is articulated in a recent publication by Hartfield et al. (2015).

USACE Threatened & Endangered Species Team (TEST) Approach. The TEST was recently developed to accelerate the development of solutions to threatened, endangered, and at-risk species currently, or having high likelihood in the future to, affect USACE mission sustainability. The TEST utilizes strategic collaborations internally (Headquarters, Division, District, Institute for Water Resources, and ERDC programs, field staff and scientists), and externally (other agencies, organizations and stakeholders) to identify challenges and develop and implement cost-effective and efficient approaches, methodologies, technologies, and solutions. The TEST is the platform for initiating and coordinating ESA Section 7(a)(1) efforts, particularly conservation planning, which was elevated as a USACE priority in 2015 by Major General Peabody. The ESA Section 7(a)(1) framework includes conservation planning, within USACE and with coordination among other federal agencies, and is being used to address both federally listed TES and at-risk species. Building upon the successful collaborations and experiences from the LMR and ILT work, the USACE TEST and USFWS committed to exploring other demonstration opportunities for combining the use of EWN principles and practices and ESA Section 7(a)(1) conservation planning within the southeastern U.S., including the Gulf of Mexico.

Engineering With Nature (EWN). Pursuing the objective of sustainable development of water resources infrastructure poses both challenges and opportunities for the USACE. Advancing our practices involves identifying the practical actions that can be taken to better align and integrate engineering and natural systems to produce more socially acceptable, economically viable, and environmentally sustainable projects.

The USACE EWN Program supports more sustainable practices, projects, and outcomes by working to intentionally align natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits through collaborative processes (*www.engineeringwithnature.org*). EWN's focus on developing practical methods provides an achievable path toward an ecosystem approach to infrastructure development and operations. Consequently, EWN principles and practices can and are being applied across multiple USACE missions and business lines.

There are four elements critical to the success of EWN projects:

1. Improving operational efficiency
2. Using natural systems and processes to maximize the benefits
3. Broadening the benefits of the project – economic, environmental and social
4. Using collaborative processes to engage stakeholders throughout the project.

The EWN Strategy is to encourage adoption of EWN principles and practices across multiple business lines and mission areas by first engaging internal leaders and early adopters, and then reaching out to our external partners and stakeholders and effectively collaborating with them to establish and achieve common goals. The USACE is drawing on leading practices in science-based strategic risk communication[1] along with other leading social science practices. Navigation was the first mission area to embrace EWN; however, its applicability has extended to all business lines.

WORKING MEETING PURPOSE: The purpose of the meeting was to align USACE and USFWS personnel to enable early identification of opportunities to use ESA Section 7(a)(1), EWN and other means to achieve ESA compliance, and TES conservation in an effective and efficient manner within the U.S. Southeast and Gulf of Mexico regions. The desired outcome for this initial meeting was to identify actions that could be considered for inclusion in ESA Section 7(a)(1) Conservation Plans, and to develop a short-list of defined opportunities for future collaboration. With the expectation that short- and long-range progress will require collaboration among field practitioners in both operations and planning functions within the USACE, ERDC research scientists and engineers, and the USFWS, this initial meeting assembled representatives from across this broad community.

MEETING OVERVIEW: Ms. Susan Whittington, USACE South Atlantic Division, Chief, Operations and Regulatory Division; Dr. Todd Bridges, ERDC, Senior Scientist for Environmental Sciences; and Ms. Meg Gaffney-Smith, Deputy Chief of Operations and Regulatory, USACE Headquarters, welcomed participants to the meeting and offered leadership insights. Ms. Whittington highlighted the challenges facing USACE and USFWS including the protection of TES and new wide-reaching critical habitat designations. She also conveyed that the meeting was very timely given the purpose and goals of the meeting were topics of interest at many USACE levels and therefore, would help to facilitate dialog with the Districts and senior leaders at Headquarters. Dr. Bridges spoke of USACE challenges with the ESA, including annual expenditures by USACE of approximately $250–300M per year on compliance with the Act, noting that while the fiscal constraints can be quantified; accounting for the resulting conservation value is difficult. Dr. Bridges noted that USACE formed the TEST as a way to develop improvements for the way USACE addresses these challenges, and achieves their missions while providing benefits to TES. He suggested that the sooner these improvements can be implemented, the better for everyone. Ms. Gaffney-Smith spoke about the benefits of working proactively with another agency and highlighted the meeting's potential opportunities for learning and sharing with

[1] Strategic Risk Communication is a purposeful process of skillful interaction with stakeholders supported by appropriate information. It is an essential component of integrated risk management. Strategic risk communications helps decision-makers and stakeholders make well-informed decisions and take appropriate actions.

others in other mission areas. She emphasized that there are many opportunities in USACE business lines to accomplish more cost-effective management that would provide benefits to TES.

Following an overview and briefing of the USACE TEST approach by Ms. Jennifer G. Brown, USACE-ERDC representatives from 7 USACE Districts provided briefings on TES Achievements and Challenges in their respective Districts. Mr. Leo Miranda, USFWS Region 4, then presented a briefing of USFWS TES achievements and challenges. Mr. Miranda's comments were followed by a discussion by Mr. Mike Harris, USFWS, on "at-risk species" conservation.

Mr. Dave Walther, USFWS, and Ms. Brown, USACE-ERDC, presented a brief overview of their agency's perspectives on ESA Section 7(a)(1). Mr. Walther's presentation focused on defining Section 7(a)(1), including an overview of the ESA and Section 7(a)(2); benefits to the action agencies; and opportunities for initiating Section 7(a)(1) planning and programs. Ms. Brown's presentation focused on integrating ESA Section 7(a)(1) into Section 7 practice. Drs. Richard Fischer and Jack Killgore, USACE-ERDC, presented case study briefings on implementation of Section 7(a)(1). Dr. Fischer presented a briefing on the interior least tern range-wide plan focusing on how USACE research and development is providing scientific data support and using interagency cooperation for consideration of delisting the ILT. Dr. Killgore presented a briefing on the LMR Channel Improvement Program's integration of Section 7(a)(1) into its ESA compliance approach. After the case study briefings, Mr. Steve Ricks, USFWS, and Dr. Killgore offered perspectives on ingredients for success and lessons learned.

At the beginning of day two, Dr. Bridges discussed the opportunities for EWN and ESA Section 7(a)(1) to advance the USACE approach. Ms. Dena Dickerson, USACE-ERDC, presented a briefing focusing on the proactive assessment of potential navigation mission impacts from the potential future listing of species currently deemed "at-risk." Mr. Walther, USFWS, presented a briefing on USFWS' ESA challenges that was followed by break-out group discussions and a facilitated group discussion.

Break-out Group Discussions. Building on the presentations and discussions that followed them, participants were divided into two facilitated groups, focused on identifying the highest value coastal and inland opportunities to use ESA Section 7(a)(1) and apply EWN principles in USACE missions and programs/projects. Each participant was asked to: identify current or potential projects or other opportunities in to use Section 7(a)(1) and EWN; prioritize the projects/opportunities; and, define the time frame for action. After eliciting responses, each group discussed and defined its top priorities and reported back to the plenary. Table 1 (Appendix A) summarizes the group contributions by the two Break-out Groups for both the coastal and inland topic areas.

Facilitated Discussion. Following the break-out group reports, facilitators led the participants in a group discussion to identify USACE's feasible, near-term opportunities using the ESA Section 7(a)(1) and EWN approach that could be utilized to exercise and socialize the approaches, and to demonstrate success (i.e., these opportunities did not have to be the highest project-level return on investment value options, but could include items that would contribute to advancing the USACE and USFWS approach technically and programmatically). Near-term opportunities included the following:

Topic: Coastal

- Beach Nourishment Programmatic Conservation Plan. Document recovery and long-term benefit and not just temporal adverse impacts.

- Use fine sediment to build local habitat/beneficial use. Coastal Refuges – Combine agency efforts; Benefits to USFWS and USACE.

- Interagency conservation planning teams for at-risk species. Collaborate regionally to figure out what is known and what needs to be known in preparation for listing. In some instances, USACE is already spending money on some at-risk species; we need to partner with other agencies to leverage capabilities and funding for maximum benefits. Increasing need to get "at-risk species" population data and life history understanding ahead of the official proposal for listing as threatened or endangered. The USACE also needs to be more proactive in developing species conservation programs rather than waiting for 7(a)(2) formal consultation.

- Convert the South Atlantic Regional Biological Assessment (SARBA) approach from solely an ESA Section 7(a)(2) focus to incorporate Section 7(a)(1). Biological assessments need to be written in a way that acknowledges the benefits gained and submit under Section 7(a)(1) process. Consider bringing in NMFS.

- Consider channel deepening projects opportunities in general (post Panama Canal expansion) and deep draft navigation use of materials. Build in more conservation benefits to help offset mitigation. This may be more achievable in maintenance dredging, as there is a present suite of beneficial options that could be done with the sediment.

- Transfer nature-based features such as those discussed in the North Atlantic Comprehensive Coastal Study for flood risk reduction efforts to the southeast region. Consider how sediments are managed to support flood risk reduction and maximize the efforts to expand the knowledge gained and lessons learned.

- Beneficial use in-water placement (e.g., Projects in Jacksonville District using Continuing Authorities Program in the Intracoastal Waterway).

- Conduct baseline assessments of species populations that are going to have high impact on USACE missions. Initiate high-value population viability modeling to determine the impact of relative numbers of take on listed and at-risk species populations. Use data to inform ESA Section 7(a)(1) conservation planning in absence of long-term monitoring data.

- Need to develop a checklist/guide for developing an ESA 7(a)(1) plan.

- Mississippi River Deep Draft Channel – Apply for, or piggyback on, the Channel Improvement Program. The upcoming re-evaluation report will require USACE to reinitiate consultation with USFWS.

- Explore opportunities with coastal restoration on existing diversions.

Topic: Inland

- Fish passage related to dams. Use knowledge of fish behavior and consider ESA Section 7(a)(1) and EWN contexts in operations and during lock and dam repairs/modifications.

- Oxbow restoration opportunities. Develop written summary of Kissimmee River Restoration effort. Also, Okeechobee River currently is between study and construction phase, which would be good timing for Section 7(a)(1) conservation planning.

- Address river sediment management with EWN in mind. Develop habitat for St. Stephens sturgeon diverting into Santee River (would also see a conservation lift to blueback herring).

- Work with military partners on their use of Section 7(a)(1) approaches. Military services have many examples that would be very informative.

- Explore mitigation conservation banking at state level (compensatory mitigation). Using authority as a federal agency to benefit listed species. Proactive actions could allow us to tap credit on future projects.

- Mississippi River Tributaries management. Address smaller streams with adjacent agriculture contributing to high sediment loads. Possibly work with the Natural Resources Conservation Service for sediment reduction tools (e.g., riparian buffers). Some older meanders can be restored to reduce maintenance. Could be an EWN approach.

- Operate USACE reservoirs to improve flow regimes (e.g., Lake of the Pines in TX).

- Interior Least Tern delisting petition. USACE needs to organize in a way to support final decision-making by USFWS.

- Moving levees away from rivers can lower flood risk and provide habitat that can contribute to conservation. This may include complications such as real estate, insurance, etc.

- USACE Flood Risk Management (FRM) Program builds beaches. Navigation projects put sand on beaches, and often no construction is involved. The benefit is normally written as adding sediment, not shore protection or habitat. Conservation plans could be written in such a way that will account for the 90% of projects and allow the flexibility to cover beach nourishment and navigation sediment discharges on beaches. The extra effort to use sediment in a way that will benefit the species may be cost-effective in the long-term. Need to be able to identify net effects.

- May need to narrow scope of Section 7(a)(1) program to activities that can be more easily quantified as far as net benefits, and funded consistently, as needed. FRM beach nourishment and navigation beneficial use placements on beaches might not be easily combined.

Opportunities and Requirements for Successes / Paths Forward. The following opportunities, ideas and requirements for success were raised during the discussion of next steps:

- Draft concise papers/summaries to document what the USACE is already doing with respect to Section ESA 7(a)(1) and/or EWN Case Studies.
- Complete requirements by USFWS for delisting the ILT and assist USFWS with any further needed actions.
- Organize and implement a Beach Nourishment Working Meeting to integrate engineering and species needs.
- Develop a decision tree or option evaluation guidance that will help personnel consider an ESA Section 7(a)(1) plan for projects.
- SARBA conversion to ESA Section 7(a)(1) Conservation Plan.
- Complete online mapping tool of our projects in relation to TES and at-risk species.
- Promote an At-Risk Species Interagency Team – Structure is needed to keep progress in motion.
- Identify where we have experienced successes, apply lessons, and build upon them.
- Develop a communication plan with NMFS.
- Data transfer/communication plan with USFWS.
- TES Subject Matter Experts (SMEs)/Species Specialists Directory - USACE does not have a dedicated entity to deal with protected species, but rather works most often project by project, often individually. USACE and USFWS need to know who/where the sources of knowledge and experience are for project-level and programmatic species conservation initiatives. A map of project footprints and TES ranges would help in searching for SMEs. Need a POC list for communicating about TES.

MEETING FEEDBACK: Positive feedback included that the meeting was very informative, was a great model for an interagency cooperation meeting by presenting an opportunity to meet and interact in an open, informal way, to acknowledge the shared intent of ESA Section 7(a)(1), and provided a means to identify opportunities suitable for the ESA Section 7(a)(1) approach. Suggested improvements were that additional USFWS counterparts could be involved in future meetings and that all participants should be offered the opportunity to have input on the agenda so they could bring appropriate resources to future meetings. A few participants suggested early distribution of read ahead documents to help participants prepare for the meeting.

SUMMARY MEETING OUTCOMES: The meeting design enabled an open, in-depth exploration of the EWN opportunities within ESA Section 7(a)(1), a first of its kind meeting for these agencies. Excellent rapport and candor, along with frank dialogue, led to a shared

understanding of ESA Section 7(a)(1), EWN, and the generation of several focused opportunities to assess for future development. The following summarizes the key outcomes and alignments of USACE and USFWS:

- Achieved consensus on the need and opportunity to conserve TES and at-risk species by developing Conservation Plans under ESA Section 7(a)(1) on a wide range of projects, enabled by EWN principles and practices.

- Shared perspectives on the need for foresight to proactively address emerging and anticipated TES issues. For example, in the next 10 years, the USFWS Southeast Region will have to evaluate a record number of species for possible listing under the ESA. The USACE can use voluntary and innovative techniques within their authorities to help recover listed species, and to conserve at-risk species with the aim that listing will not be necessary. Productive dialogue revealed many shared interests and resulted in a better understanding of each agency's missions, roles, responsibilities, challenges, and opportunities.

- Greater understanding of accomplishments to date by both agencies, including identification of some potential leading practices that should be shared broadly.

- Acknowledgement that implementation of ESA Section 7(a)(1) will be a paradigm shift for both organizations – from reactive cultures focused on "take" reduction, to working proactively and collaboratively to efficiently and cost-effectively broaden project benefits.

- Recognition that approaches pursued by USACE and USFWS within the southeast region can serve as a model for other areas of the U.S.

- Clear recognition by participants that collaboration on projects will produce more value to the nation and that some, but not all, USACE projects can be designed, delivered, and maintained to provide benefits to TES while reducing operations and/or maintenance costs. Formalization of these practices through ESA Section 7(a)(1) Conservation Plans and documentation of the conservation outcomes would focus attention on these benefits and be advantageous to USACE and USFWS.

- The use of EWN practices and collaborative development of ESA Section 7(a)(1) Conservation Plans has the potential to substantially streamline the Section 7(a)(2) process, thereby reducing time, effort, and frustration; resulting in accelerated schedules and beneficial project outcomes, including for TES.

- There is high value in applying the broad, holistic approach made possible through ESA Section 7(a)(1) Conservation Plans which (a) support an ecosystem approach; (b) enable conservation of TES; and, (c) focus on strategies and actions that can benefit species within existing authorities and projects/programs.

- Getting ahead of upcoming ESA species listings by including at-risk species in the proactive application of Section 7(a)(1) on appropriate projects may result in substantial long-term benefits.

- There is a need to share, and keep current, data on TES and at-risk species.

- Ongoing collaboration through productive, solutions-focused relationships is critical to success. USACE and USFWS relationships, and the results they produce, can demonstrate to other agencies the value of working cooperatively.

NEXT STEPS: The USACE and USFWS participants agreed to continue to work together to identify ESA Section 7(a)(1) project opportunities that incorporate EWN principles and practices. Immediate next steps include:

- TEST meeting participants will refine near-term project opportunities from the list developed during the meeting.

- USACE and USFWS will work collaboratively to develop a basic guidance template for Section 7(a)(1) that incorporates EWN.

- Expand existing research and development efforts on this initiative to facilitate leadership support and speed implementation and integration of EWN and ESA Section 7(a)(1) approaches, including development and refinement of decision support tools such as a TES web application.

- Systematically document case studies and demonstration project results within the southeastern region to support technology transfer across both agencies and beyond.

ADDITIONAL INFORMATION: This Technical Note was prepared by Jennifer G. Brown, Research Biologist, U.S. Army Engineer Research and Development Center. The summary was prepared as an activity of the USACE EWN Initiative. For more information on EWN, please consult *www.engineeringwithnature.org*. You may also contact the USACE EWN lead, Dr. Todd Bridges (*Todd.S.Bridges@usace.army.mil*). For more information on TEST, please contact Dr. Richard Fischer (*Richard.A.Fischer@usace.army.mil*). This Technical Note should be cited as follows:

> Brown, J. G., R. A. Fischer, C. J. Banks. 2017. *Threatened and Endangered Species Team Approach - USACE Southeastern Region Opportunity Assessment Working Meeting: Advancing Cost-Efficient and Effective Endangered Species Act (ESA) Compliance & Mission Sustainability through Engineering With Nature (EWN) and ESA Section 7(a)(1) Conservation Plans*. EWN Technical Notes Collection. ERDC TN-EWN-??-X. Vicksburg, MS: U.S. Army Engineer Research and Development Center. *www.engineeringwithnature.org*.

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APPENDIX A

Table 1. Opportunities

Group 1	Group 2
Top Ranked Opportunities and Timeframes for Implementation - Coastal	
1. Integrate National Marine Fisheries Service into Mississippi Coastal Improvements Program and make a joint 7(a)(1) program • Immediate: 12 – 18 months 2. Beach nourishment/EWN for sea turtles • Immediate, ASAP 3. Use dredged material to create shorebird foraging habitat (Piping Plover/Red Knot). • 5 - 10 years 4. Programmatic beach nourishment under 7(a)(1) for listed species • Immediate – 3 years 5. Address beach nourishment constraints – find creative solutions 6. Conservation planning for non-listed species where likelihood of listing is high. Identify at-risk species USACE has greatest management purview over for biggest ROI for multi-stakeholder engagement? • 1 year 7. Regional Conservation Plan for all turtles and birds including all habitat enhancement features. Use 7(a)(1) as tool to reduce need for re-initiation of beach nourishment formal consultations 8. Programmatic 7(a)(1) for USFWS: This would follow the path above but would be focused on USFWS. High priority. • 3 – 5 years. 9. Develop 7(a)(1) plan for sea turtles, birds, and sturgeon on Deep draft navigation project. 10. Transition to nature based features – Expand Hurricane Sandy efforts on Flood Risk Management (FRM) to different geographic areas. 11. Beneficial use of in-water placements – most Intracoastal Waterways provides opportunities 12. Need baseline assessment of species about to be listed. Develop population models and population viability models. Share data with USFWS. 13. Form an At-Risk Species Population Interagency Team: USACE & USFWS 14. Investigate implementing 7(a)(1) on beach nourishment regardless of where the	1. Use of existing projects – Already have regional Biological Opinions in place so simply restructure into adaptive conservation plans. USACE is already doing many 7(a)(1)-type actions but not documenting them as such. Will need to tie to routine activities for this suite of species: navigation, upland placement, and FRM-beach nourishment projects we are already working on. • Immediate -3 year 2. Region-wide Section 7(a)(1) plan for all beach nourishment plans to streamline individual consultation. Could include the separate beach projects under that comprehensive regional plan. • 2-3 year implementation 3. Create strip of beach for shorebirds in Savannah District. Disposal area dike is corroding and falling into ship canal. A training wall that is not maintained and is below the water line could be reinforced to help with erosion or use reef balls and consider notching to create beach habitat for birds. , Savannah District and ERDC are currently working on it. Possible EWN and ESA 7(a)(1) demonstration project. • 2-3 year implementation 4. Continuing Authority Program that funds smaller local projects may provide opportunity to engage agency partners and local sponsors. Section 7(a)(1) could be integrated in the project kick-off rather than on the end for consultation. Funding is often unpredictable, but if funded, a great way to pull it in cooperators is to multiply the benefits. Implementation would be project specific, May have lower priority because of local focus. (Possibly “Low Hanging Fruit” category.) 5. MS Coastal Improvement Program (MsCIP) - Barrier island creation/restoration efforts and inland wetland restoration efforts. EWN principles could be applied immediately. Could make slight adjustments in plans and specifications to broaden and increase the benefits. WRRDA will provide additional authority. • Immediately relevant, 0-10 years

sediments are coming from and for purpose (e.g. for Navigation or FRM) 15. Narrow scope of 7(a)(1) conservation program so USACE can demonstrate the benefits to beach species 16. Engagement with EPA on flexibility 17. Build EWN, biological opinion, and conservation into mental models to change cultural thinking 18. Water flow – management may have positive impacts on many species of mussels 19. Enhance fish passage by using existing locks 20. Update USACE operations plans (e.g., Master Manuals) with 7(a)(1) strategy and communications language. 21. Get out in front on habitat studies at our sites – e.g., bats. 22. Utilize the momentum towards natural and nature-based features for flood risk management to advance ESA conservation efforts in the navigation business line, and across business lines by building in benefits. As an example: the Gulf Restoration Initiative • 5 – 10 years. 23. Next deepening project: Begin/integrate 7(a)(1) into plans/designs and begin consultation via 7(a)(1). High priority. Even a 10% mitigation reduction would be highly desirable. • 3 – 10 years. 24. From a Section 7(a)(1) perspective, what can we be doing to create foraging (reef?) and nursery and other habitat to increase shark numbers? This might require some engagement with EPA to get flexibility on placement sites.	6. Think outside the ESA box for opportunities (i.e., Migratory Bird Treaty Act compliance). Any species we can keep off the list is a benefit. Consider upcoming species that will be big issues (e.g. bats, migratory birds). In TX, DoD and Homeland Security is putting up wind turbines that have adverse impacts to bat and birds. Section 7(a)(1) is much broader than TES, and should be much more holistic. 7. Take multi-species approach when it makes sense. Figure out where species and processes intersect. By focusing on a specific species we may be putting other species at risk. 8. Deep Draft Navigation for habitat creation. Create habitat with deep draft derived materials. Section 7(a)(1) would broaden the number of species we target with beneficial use. Many times local agencies present roadblocks for beneficial use of deep draft sediments. This may be a way to move those efforts forward and get partners onboard. • 0-3 year implementation 9. Watershed-based Section 7(a)(1) conservation plans for routine Corps activities. Would provide regional component and could tie into watershed planning and budgeting efforts. Only occasionally have funding for watershed studies and difficult to fit into USACE 3x3x3 plan as well as identify sponsors. Instead of single project scopes, a wider plan scope may yield a cumulative net benefit across the watershed. • Long term.
Top Ranked Opportunities - Inland	
1. Deep draft channel – opportunity to piggyback on existing Conservation Plan • Immediate 2. Work with military services on Integrated Natural Resources Management Plans; Transfer experience and methods learned to initiate Section 7(a)(1) activities for USACE owned and managed lands. 3. Fish passage related to dams, locks, reservoirs – Use science and Section 7(a)(1) thinking to inform EWN project designs and operations plans. 4. Coastal Restoration – Old River Control Complex (has no biological opinion) and existing diversions. May be a good candidate for Section 7(a)(1) trial.	1. Conservation plan for Cooper River re-diversion project. St. Stephen hydropower plant. (Dam without a lake.) Have existing group that meets quarterly, could include Section 7(a)(1) conservation plan development. Current focus is on sturgeon. Could integrate EWN on bank erosion instead of typical rip-rap. 2. Regional conservation of threatened Rabbitsfoot mussel in Mississippi River Watershed (and other freshwater mussels) - build on what's in place for LMR plan for fat pocketbook mussel. See what is applicable for this species. Collect data about the species. • 1-2 year implementation 3. Environmental Flows for Mussels – in the southeast we have drastic changes in water

5. Blueback herring (species of concern) – Include this species in existing project operations plans – apply 7(a)(1) measures now.
6. Oxbow restoration – between study phase and construction. Document Kissimmee River restoration.
7. River sediment management in rivers – value for habitat. Incorporate EWN.
8. Delisting needs to be completed for some species. Finish the ILT 7(a)(1) conservation plans for USACE Southwest and Great Lakes/Ohio River Divisions.
9. Develop an interagency Inland At-Risk Species Working Group. High priority. Before species listed and regulations established.
    - ASAP
10. Explore mitigation/conservation banking – beneficial outputs offset negative impacts
11. Mississippi River Channel deepening, is also part of the Channel Improvement Program, but is not part of the 7(a)(1). Could we add onto the existing LMR 7(a)(1) even though this would be a separate authority but could help meet the USACE Planning 3x3x3 requirements?
12. Mississippi River tributary management
13. Operations of Corps reservoirs. Strategic environmental flows/reservoir releases for wetlands management. Revamp master plans to include NGO collaborations.
14. Levee setbacks – moving levees away from river can lower flood risks and provide habitat development opportunities.
15. Natural Wildlife Refuges – USACE dredged material passes right by some of these sites. Huge opportunity to use sediment for multiple benefits (FRM, TES, etc.). Need refuge agency to request resource.
16. Address low-use projects some of which may be in process of deauthorization. What could the Corp do in cost-share with, or transfer to others for species benefit?
17. From a taxonomic level (numbers of species): Freshwater mussels have the greatest impact on Corps projects as a whole (all business lines). availability, aquifer depletion, rivers suffering from low water. Freshwater mussels impact the most number of projects for the Corps, 22+ species listed. Many will have similar life histories. Until there is a plan put in place we're losing mussels. Developing a conservation plan for fresh water mussels would be beneficial across the board.
    - 10 year implementation
4. Fish Passage –utilizing existing low use facilities (locks) for upstream movement of migratory fishes. Great success boosting numbers for Alabama shad (petitioned for listing in 2013). Alabama started reintroduction program that has been successful. Low cost, high reward; however 7(a)(1) conservation plan is needed for USACE buy-in to justify continued lock operation for fish passage as well as to take credit for benefit to species.
    - Immediate Implementation (already doing)
5. Take Military's Integrated Natural Resources Management Plans and apply to Civil Works (CW) operations. Should have something like this in existence on Corps lands. Look at developing these plans and submitting as 7(a)(1) approach. The Master Plans have an environmental stewardship piece. Re-package Master Plans with Section 7(a)(1) focus with bird and bat species in particular. Funding is there but need operation money diverted to Resources Management Plan and apply to CW operations. Efficiencies gained would outweigh the cost of getting these plans modified/converted.
    - Immediate-Ongoing