Regulatory Impact Analysis

for the

Proposed 2017 Nationwide Permits

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List of Acronyms

CWA	Clean Water Act
DA	Department of the Army
GC	General Condition
NWP	Nationwide Permit
ORM	OMBIL Regulatory Module
PCN	Pre-construction Notification
SIP	Standard Individual Permit

Executive Summary

The Corps is proposing to reissue 50 existing nationwide permits (NWPs) and issue two new NWPs. The NWPs authorize a variety of activities in jurisdictional waters and wetlands under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. Each year, the NWPs authorize over 60,000 activities that result in no more than minimal individual and cumulative adverse environmental effects. The NWPs can only be issued for a period of five years. The NWPs were last reissued on February 13, 2012, and those NWPs expire on March 18, 2017. If the NWPs are not reissued and project proponents wish to proceed with their project, they will have to obtain an individual permit from the Department of the Army to fulfill the permit requirements of Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899.

For this regulatory impact analysis (RIA), the Corps examined the direct and indirect costs of the regulated entities to comply with the NWPs. We also examined the administrative costs. The baseline for this analysis was the 2012 NWPs and the estimated annual numbers of NWP authorizations (both reporting and non-reporting activities), as well as activities authorized by standard individual permits intended to be authorized by the 2017 NWPs (e.g., removal of low-head dams, living shorelines, and other activities authorized by changes to the NWPs). Using that baseline, the Corps analyzed two alternatives scenarios: Alternative 1 compares the proposed 2017 NWPs to the existing 2012 NWPs and Alternative 2 compares the proposed 2017 NWPs to there not being any nationwide permits available. In both scenarios, we assumed that all projects that would otherwise receive a NWP would proceed with an individual permit although we understand that some project proponents may choose to not proceed with their intended project.

Under Alternative 1, we estimate that there would be an average annual decrease of 281 standard individual permits below the baseline because of new or modified NWPs (and a corresponding increase in NWPs) and that the Corps would receive 31,490 NWP pre-construction notifications (PCNs) per year. Under Alternative 2, the Corps would receive 49,556 standard individual permit applications per year. The compliance costs of Alternative 2 represent the cost savings achieved by the NWP program.

Under Alternative 1, the estimated annual direct compliance costs would be between $464,000,000 and $801,000,000 per year, $11 million to $26 million per year less than the baseline direct compliance costs. Under Alternative 2, the estimated annual direct compliance costs would increase by between $1,245 million and $3,541 million per year. The compliance costs of Alternative 2 represent the cost savings achieved by the NWP program.

The indirect costs are evaluated as opportunity cost using a surrogate of examining the differences in evaluation times for the two alternatives compared to the baseline. Alternative 1 would result in substantially lower opportunity costs compared to Alternative 2.

In terms of administrative costs, under Alternative 1 we estimate that administrative costs would be approximately $600,000 less than the baseline administrative costs. For Alternative 2, the administrative costs would be approximately $87,900,000 more than the baseline administrative costs.

The NWPs provide benefits in terms of encouraging project proponents to minimize their proposed impacts to waters of the United States and design their projects within the scope of the NWPs, rather than applying for individual permits for activities that could result in greater adverse impacts to the aquatic environment. The NWPs also benefit the regulated public by providing convenience and time savings compared to standard individual permits. The minimization encouraged by terms and conditions of an NWP, as well as compensatory mitigation that may be required for specific activities authorized by an NWP, helps reduce adverse environmental effects to jurisdictional waters and wetlands, as well as resources protected under other laws, such as listed species and critical habitat and historic properties.

1.0 Regulatory Program Background

The Corps Regulatory Program administers three laws: Section 404 of the Clean Water Act, Section 9 and 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended. Under Section 404 of the Clean Water Act, a permit is required to discharge dredged or fill material into waters of the United States. Under Section 9 of the Rivers and Harbors Act of 1899, a permit is required to construct dams or dikes across navigable waters of the United States. The obstruction or alteration of a navigable water of the United States requires a permit under Section 10 of the Rivers and Harbors Act of 1899. Under Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended, a permit is required to transport dredged material for disposal into ocean waters.

There are two categories of permits that the Corps may issue under its authorities: individual permits and general permits. Individual permits include standard individual permits and letters of permission. General permits include nationwide permits (NWPs), regional general permits, and programmatic general permits. These permit types are described in more detail below:

- ***Standard individual permits*** are Department of the Army (DA) permits that have been processed through the public interest review procedures, including public notice and receipt of comments, activity-specific National Environmental Policy Act documentation (e.g., an environmental assessment or environmental impact statement), and, if the proposed activity involves discharges of dredged or fill material into waters of the United States, an activity-specific 404(b)(1) Guidelines analysis to ensure that the discharge of dredged or fill material complies with the environmental criteria in those Guidelines.

- ***Letters of permission*** are also individual permits issued after an abbreviated public interest review procedure, and usually involve coordination with federal and state agencies prior to making a decision on the permit application.

- ***Nationwide permits*** are type of general permit issued by the Chief of Engineers to authorize categories of activities across the country that have no more than minimal individual and cumulative adverse environmental effects. Corps division engineers can modify, suspend, or revoke NWPs in a particular region, or for a specific category of activities or waters (see 33 CFR 330.5(c)). Corps district engineers can modify, suspend, or revoke activity-specific NWP authorizations (see 33 CFR 330.5(d)) in their districts.

- ***Regional general permits*** are a category of general permit issued by Corps division or district engineers to authorize categories of activities on a regional basis. As of February 2015, there were 224 regional general permits in effect.

- ***Programmatic general permits*** are a specific type of regional general permit intended to reduce duplication with a similar federal, state, or local agency program. As of February 2015, there were 19 programmatic general permits in effect.

The NWPs can be issued under two of the Corps' statutory authorities: Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. Under Section 404(e) of the Clean Water Act, general permits can be issued for a period of no more than five years. The 2012 NWPs expire on March 18, 2017, and cannot be extended.

The authority to issue NWPs was delegated to the Chief of Engineers by the Assistant Secretary of the Army (Civil Works). The current regulations for implementing the NWP Program were issued on November 22, 1991 (56 FR 59110). Those regulations also contain procedures where Corps divisions and district engineers can modify, suspend, or revoke NWPs.

Some general permits require the project proponent to submit a notification to the appropriate Corps district before beginning the authorized activity. Other activities authorized by general permits do not require prior notification to the Corps district, and the project proponent can proceed with the activity as long as he or she complies with all terms and conditions of the general permit and has obtained any required water quality certification (or waiver) and/or Coastal Zone Management Act consistency concurrence (or a presumption of concurrence). The Corps records all requests for general permit verifications in its database, the OMBIL Regulatory Module (version 2) (ORM2). In ORM2, the Corps tracks the general permit used, the authorized impacts, and any required compensatory mitigation. Many project proponents request written confirmation from the Corps that an activity is authorized by NWP or another type of general permit, even if pre-construction notification is not required by the terms and conditions of that NWP or other general permit. The Corps also tracks these voluntary notifications in ORM2.

Nationwide permits were first issued by the Corps in 1977 (42 FR 37122) to authorize categories of activities that have minimal adverse effects on the aquatic environment, and streamline the authorization process for those minor activities. After 1977, NWPs have been issued or reissued in 1982 (47 FR 31794), 1984 (49 FR 39478), 1986 (51 FR 41206), 1991 (56 FR 59110), 1995 (60 FR 38650), 1996 (61 FR 65874), 2000 (65 FR 12818), 2002 (67 FR 2020), 2007 (72 FR 11092), and 2012 (77 FR 10184).

For this RIA, we use mostly Regulatory Program data from FY 2015. For certain components of this analysis, we also use Regulatory Program data from 2010 to 2014. Primary sources of information from the cost analyses were the Institute for Water Resources' 2001 report on the 2000 issuance and modification of NWPs (IWR 2001) and Sunding and Zilberman's (2002) examination of the changes to the wetland permitting process in the 2000 NWPs.

Table 1.1 provides the number of individual permits and general permit verifications issued by Corps districts in FY 2015, by permit type. This table does not include all activities authorized by general permits because many authorized activities do not require notification to the Corps prior to conducting authorized activities. In Appendix B of this report, we estimate the numbers

of non-reporting NWP activities where project proponents did not request written verifications that their proposed activities qualified for NWP authorization.

Table 1.1 Numbers of written authorizations issued in FY 2015, by permit type

Permit Type	Number of written authorizations issued
Standard individual permit	1,694
Letter of permission	1,409
Nationwide permit	31,707
Regional general permit	16,311
Programmatic general permit	5,803
Total	**56,924**

Table 1.2 summarizes the mean amount of time it took Corps districts to evaluate standard individual permits, letters of permission, and general permit verification requests. The number of days of review is the number of days it takes the Corps to reach a permit decision after it receives a complete individual permit application, a complete NWP PCN (if one is necessary), or a complete general permit verification request. The requirements for a complete individual permit application are found at 33 CFR 325.1(d). The requirements for a complete NWP PCN are found in paragraph (b) of general condition 32, but Corps districts may require additional information through regional conditions approved by the division engineer. The requirements for a complete PCN for a regional general permit or programmatic general permit are described in the each regional or programmatic general permit, if that general permit authorizes activities that require pre-construction notification.

The total number of application days is calculated from the date the Corps receives a permit application, NWP PCN (if one is necessary), or general permit verification request, to the date the Corps makes its decision on the permit application, NWP PCN, or general permit verification request. The individual permit application, NWP PCN, or general permit verification request may not be complete when the Corps district receives it. If additional information is required to make the individual permit application, NWP PCN, or general permit verification request complete, the Corps district will request that information from the applicant or his or her consultant. The mean total application days signifies, from the applicant's perspective, the length of time it takes to receive an individual permit, NWP verification letter, or general permit verification letter from the Corps.

Table 1.2. Evaluation times during FY 2015, by permit type. The numbers in this table apply to requests for written authorizations from Corps districts. They do not include activities authorized by NWPs, regional general permits, and programmatic general permits that are not reported to Corps districts.

Permit Type	Mean evaluation days	Mean total application days
Standard individual permit	211	291
Letter of permission	110	140
Nationwide permit	41	86
Regional general permit	40	68
Programmatic general permit	24	24

The mean evaluation days and the mean total application days include the number of days required to conduct consultations required by Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act. Endangered Species Act Section 7 consultation is required for any activity requiring DA authorization that may affect listed species or critical habitat. National Historic Preservation Act Section 106 consultation is required for any activity requiring DA authorization that has the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places.

The information required to apply for a standard individual permit is somewhat different than the information necessary to obtain an NWP verification (whether or not a PCN is required). The information requirements for a complete standard individual permit application are provided in the Corps' regulations at 33 CFR part 325.1(d)(1)-(9). The information requirements for a complete NWP PCN are listed in paragraph (b) of general condition 32. Many of the information requirements are similar for standard individual permit applications and NWP PCNs, such as applicant and consultant contact information, project location information, description of the proposed activity, statement of project purpose, quantification of project impacts, description of mitigation measures, statement regarding whether any portion of the project has already been completed, list of other authorizations needed for the project, and signature of the applicant. An application for a standard individual permit also requires the addresses of adjoining property owners. An NWP PCN also requires information on Endangered Species Act listed species or critical habitat that might be affected by the proposed work, and/or historic properties that have the potential to be affected by the proposed work. We are proposing to change the NWP PCN requirements to including, when applicable, information on any requests for 408 permissions for activities that may alter or occupy a Corps federally-authorized Civil Works project and any proposed NWP activities that may occur in rivers covered under the Wild and Scenic Rivers Act.

The convenience and time savings associated with the NWPs encourages users of the NWPs to minimize their proposed impacts to waters of the United States and design their projects within the scope of the NWPs rather than apply for individual permits for activities that could result in greater adverse impacts to the aquatic environment. The minimization encouraged by the issuance of an NWP, as well as compensatory mitigation that may be required for specific activities authorized by an NWP, helps reduce adverse environmental effects to jurisdictional waters and wetlands, as well as resources protected under other laws, such as listed species and critical habitat and historic properties.

2.0 Nationwide Permit Authorization Process

There are currently 50 NWPs. They were issued on February 13, 2012, and were published in the Federal Register on February 21, 2012 (see 77 FR 10184 – 10290). When Corps Headquarters issues or reissues an NWP, it prepares a decision document. There is a decision document for each NWP and each decision document includes an environmental assessment to fulfill the requirements of the National Environmental Policy Act and a public interest review. If the NWP authorizes discharges of dredged or fill material into waters of the United States, the decision document includes a Clean Water Act Section 404(b)(1) Guidelines analysis. For the issuance of a general permit that authorizes discharges of dredged or fill material into waters of the United States, the 404(b)(1) Guidelines require an evaluation of the potential individual and cumulative impacts of the category of activities to be authorized by that general permit (see 40 CFR part 230.7(b)).

When the NWPs are issued or reissued, division engineers prepare supplemental decision documents to provide regional analyses for the NWPs and ensure that those NWPs will only authorize activities with no more than minimal individual and cumulative adverse environmental effects within that region (usually a state or a Corps district's geographic area of responsibility). The supplemental decision document also addresses regional conditions imposed by division engineers to provide additional protection to jurisdictional waters and wetlands, and other resources as appropriate. Regional conditions may only further restrict the use of an NWP. Regional conditions cannot increase acreage limits or other types of limits for an NWP.

A project proponent who wants to use one or more NWP(s) to fulfill the requirements for DA authorization for discharges of dredged or fill material into waters of the United States and/or structures or work in navigable waters of the United States must comply with all applicable terms and conditions of the appropriate NWP(s), including any regional conditions imposed by the division engineer and any activity-specific conditions imposed by the district engineer. If the project proponent does not fully comply with the applicable terms and conditions of the NWP(s), it is an unauthorized activity and he or she may be subject to an enforcement action.

Some NWPs have general or regional conditions that require the project proponent to submit a PCN prior to commencing the activity authorized by an NWP. Other NWPs do not require pre-construction notification. For the proposed 2017 NWPs, 23 NWPs require PCNs for all activities, 10 NWPs require PCNs for some activities, and 19 NWPs do not require PCNs unless a general condition such as general condition 18 for endangered species or general condition 20 for historic properties require PCNs for activities that might affect listed species, critical habitat, or historic properties. Regional conditions imposed by division engineers may also add PCN requirements to one or more NWPs. The requirements for a complete NWP PCN are listed in paragraph (b) of general condition 32.

For non-federal permittees, NWP general condition 18 requires non-federal project proponents to submit PCNs if any Endangered Species Act (ESA) listed species or designated critical habitat

might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat. In such cases, the non-federal project proponent is not authorized to begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. There is a similar general condition (general condition 20) for historic properties under Section 106 of the National Historic Preservation Act (NHPA). General condition 20 requires non-federal project proponents to submit PCNs to Corps districts when proposed activities may have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. The non-federal project proponent cannot begin the NWP activity until notified by the Corps district that the requirements of Section 106 of the NHPA have been fulfilled.

For those NWPs that do not require PCNs, the project proponent can proceed with the NWP activity as long as he or she complies with all applicable general and regional conditions, and has obtained any required water quality certification or waiver and/or Coastal Zone Management Act consistency concurrence or presumption of concurrence (see 33 CFR 330.4(c) and (d), as well as NWP general conditions 24 and 25). A water quality certification or waiver is required if the NWP activity results in a discharge into waters of the United States. A Coastal Zone Management Act consistency concurrence or presumption of concurrence is required for any NWP activity that would affect land or water use or natural resources of the state's coastal zone.

Many project proponents submit NWP verification requests to Corps districts even though the terms and conditions of the applicable NWP(s) do not require PCNs, because they are seeking written confirmation from the Corps that their proposed activities are authorized by NWPs (see 33 CFR 330.6(a)(1)). Such written confirmations from the Corps may also be required by state and local government agencies, as conditions of their own authorizations (e.g., local building permits) to conduct those activities in accordance with state laws and local ordinances. After a Corps district receives an NWP PCN or a written request for an NWP verification, it is reviewed by Corps district staff. The Corps staff will determine whether the proposed activity qualifies for NWP authorization, and whether there may be affects to ESA listed species or designated critical habitat, or historic properties subject to Section 106 of the NHPA. If the proposed activity may affect listed species or designated critical habitat, or historic properties, the Corps district will notify the project proponent that ESA Section 7 consultation and/or NHPA Section 106 is required, if the project proponent is a non-federal entity. After such notification by the Corps district, the non-federal permittee cannot begin the proposed NWP activity until he or she is notified by the Corps that the requirements of ESA Section 7 and/or NHPA Section 106 have been fulfilled. If the project proponent is a federal entity, the Corps will review that agency's documentation of ESA Section 7 compliance and/or NHPA Section 106 compliance and may accept that compliance for the purposes of the NWP authorization. If the Corps determines that the federal agency's ESA Section 7 and/or NHPA Section 106 compliance is not sufficient for the purposes of the NWP's compliance with ESA Section 7 or NHPA Section 106, the Corps may request that the federal agency conduct additional ESA Section 7 consultation and/or NHPA Section 106 consultation for the proposed NWP activity.

When reviewing a PCN for the proposed activity, or a voluntary request for an NWP verification, the district engineer will determine whether the proposed NWP activity will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. Section D of the proposed 2017 NWPs discusses the decision-making process. Paragraph 2 of that section describes the criteria the Corps district considers when making a minimal effects determination for an NWP PCN or voluntary verification request. When the term "NWP activity" is used, it refers to the activities authorized by the NWP (i.e., discharges of dredged or fill material into waters of the United States regulated under Section 404 of the Clean Water Act and/or structures or work regulated under Section 10 of the Rivers and Harbors Act of 1899). The NWP activity does not include components of a larger overall project that are not regulated by the Corps under its statutory authorities. When making minimal effects determinations, the district engineer will consider:

- The direct and indirect effects caused by the NWP activity.
- The environmental setting in the vicinity of the NWP activity.
- The type of resource that will be affected by the NWP activity.
- The functions provided by the aquatic resources that will be affected by the NWP activity.
- The degree or magnitude to which the aquatic resources perform those functions.
- The extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss).
- The duration of the adverse effects (temporary or permanent).
- The importance of the aquatic resource functions to the region (e.g., watershed or ecoregion).
- Mitigation required by the district engineer.

If an appropriate functional or condition assessment method is available and practicable to use to evaluate the jurisdictional waters and wetlands that would impacted by the NWP activity, that assessment method may be used by the district engineer to assist in the minimal adverse effects determination.

The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns. The permittee must comply with these conditions, as well as any applicable general conditions and regional conditions.

The district engineer will consider any proposed mitigation the applicant has included in the PCN or voluntary NWP verification request to determine whether the net adverse environmental effects to the aquatic environment of the proposed activity are no more than minimal. In the NWP verification, the activity-specific permit conditions addressing compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k) and 33 CFR 325.4. The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer

determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

If the district engineer determines that the net adverse effects of the NWP activity on the aquatic environment (after consideration of the compensatory mitigation proposal) are minimal, he or she will provide a timely written response to the applicant. The response will state that the activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

If the district engineer determines that the adverse effects of the proposed NWP activity are more than minimal, then the district engineer will notify the applicant either:

- That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit;
- That the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or
- That the project is authorized under the NWP with specific modifications or conditions.

In a specific watershed, state, county, or other geographic area (e.g., a Corps district), Corps division or district engineers may determine that the cumulative adverse effects of activities authorized by specific NWPs are more than minimal. Division and district engineers will conduct more detailed assessments for geographic areas that are determined to be potentially subject to more than minimal cumulative adverse effects. Division and district engineers have the authority to modify, suspend, or revoke NWPs on a regional or case-specific basis and require individual permits in watersheds or other geographic areas where the cumulative adverse effects are determined to be more than minimal, or add conditions to the NWP either on a regional or case-by-case basis to require mitigation measures to ensure that the cumulative adverse effects are minimal. When a division or district engineer determines, using local or regional information, that a watershed or other geographic area is subject to more than minimal cumulative adverse effects due to the use of a specific NWP, he or she will use the revocation and modification procedure at 33 CFR 330.5. In reaching the final decision, the division or district engineer will compile information on the cumulative adverse effects and supplement the regional analyses he or she conducted when the NWPs were issued or reissued.

3.0 Estimation of Permitting Changes

The proposed 2017 NWPs were compared to the 2012 NWPs to estimate the permitting changes expected to occur if the proposed 2017 NWPs are issued. For those activities that were not authorized by the 2012 NWPs, but may be authorized by the proposed 2017 NWPs, we assumed that those activities were authorized by standard individual permits (SIPs) while the 2012 NWPs were in effect. We also evaluated whether there were activities that were authorized by the 2012 NWPs but would not be authorized by the proposed 2017 NWPs. For the purpose of this RIA, we assumed that standard individual permits would be required in those cases. We also examined changes to the NWP PCN thresholds and general conditions, to determine whether there would be any changes to the numbers of NWP activities that require PCNs, and would therefore affect compliance costs and administrative costs. The estimated permitting changes for the 50 existing NWPs and the two proposed new NWPs are described in more detail in Appendix A.

Figure 3.1 illustrates the screening process that was used to estimate the permitting changes from the 2012 NWPs to the 2017 NWPs. Activities that do not qualify for the proposed 2017 NWPs were assumed to be processed through the standard individual permit process instead of potential authorization by regional or programmatic general permits.

Figure 3.1 – Permitting changes for activities previously authorized by the 2012 NWPs

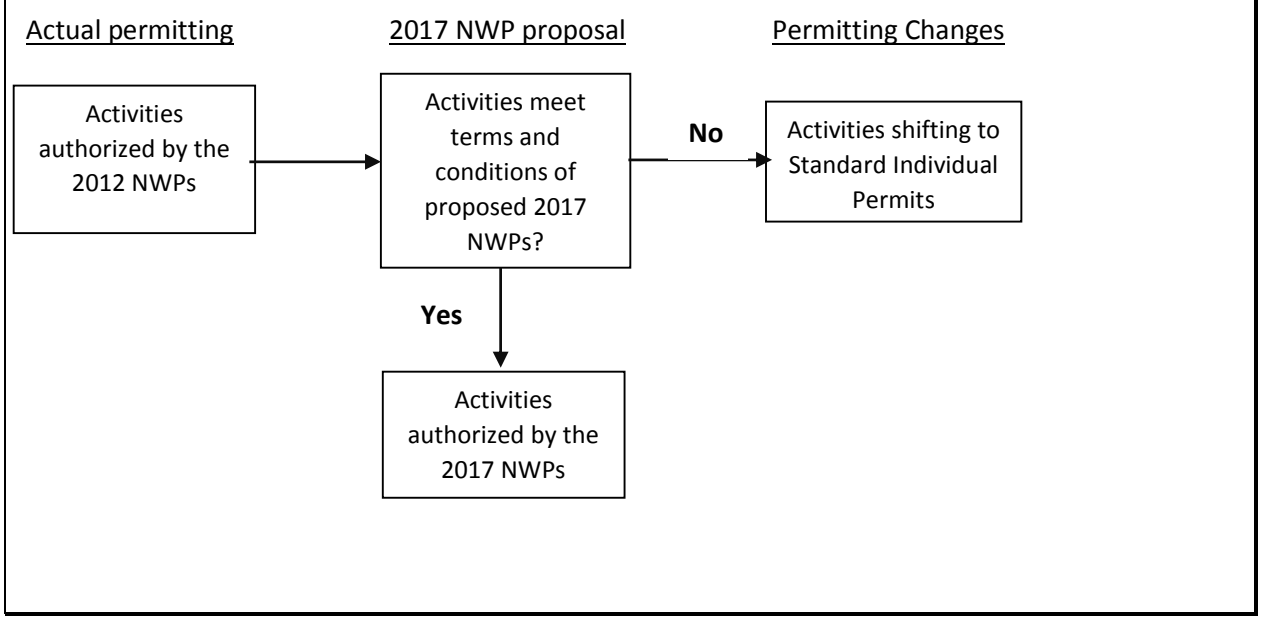


Figure 3.2 shows the screening process that was used to estimate the permitting changes for activities that required standard individual permits when the 2012 NWPs were in effect that would be authorized by the proposed 2017 NWPs.

Figure 3.2 – Permitting changes for activities that were not authorized by the 2012 NWPs but could be authorized by the proposed 2017 NWPs.

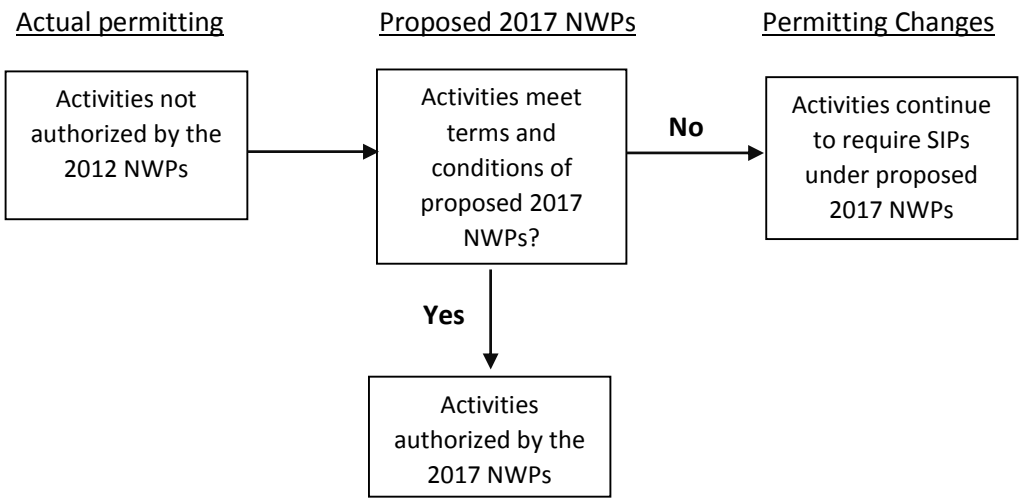


Figure 3.3 shows the screening process to determine whether activities authorized by the 2012 NWPs and required PCNs would continue to be authorized by the 2017 NWPs and either continue to require PCNs or may proceed without the requirement to submit PCNs. Figure 3.3 also includes screening for activities that required standard individual permits while the 2012 NWPs were in effect and might qualify for NWP authorization under the 2017 NWPs.

Figure 3.3 Changes in Pre-Construction Notification requirements under the proposed 2017 NWPs

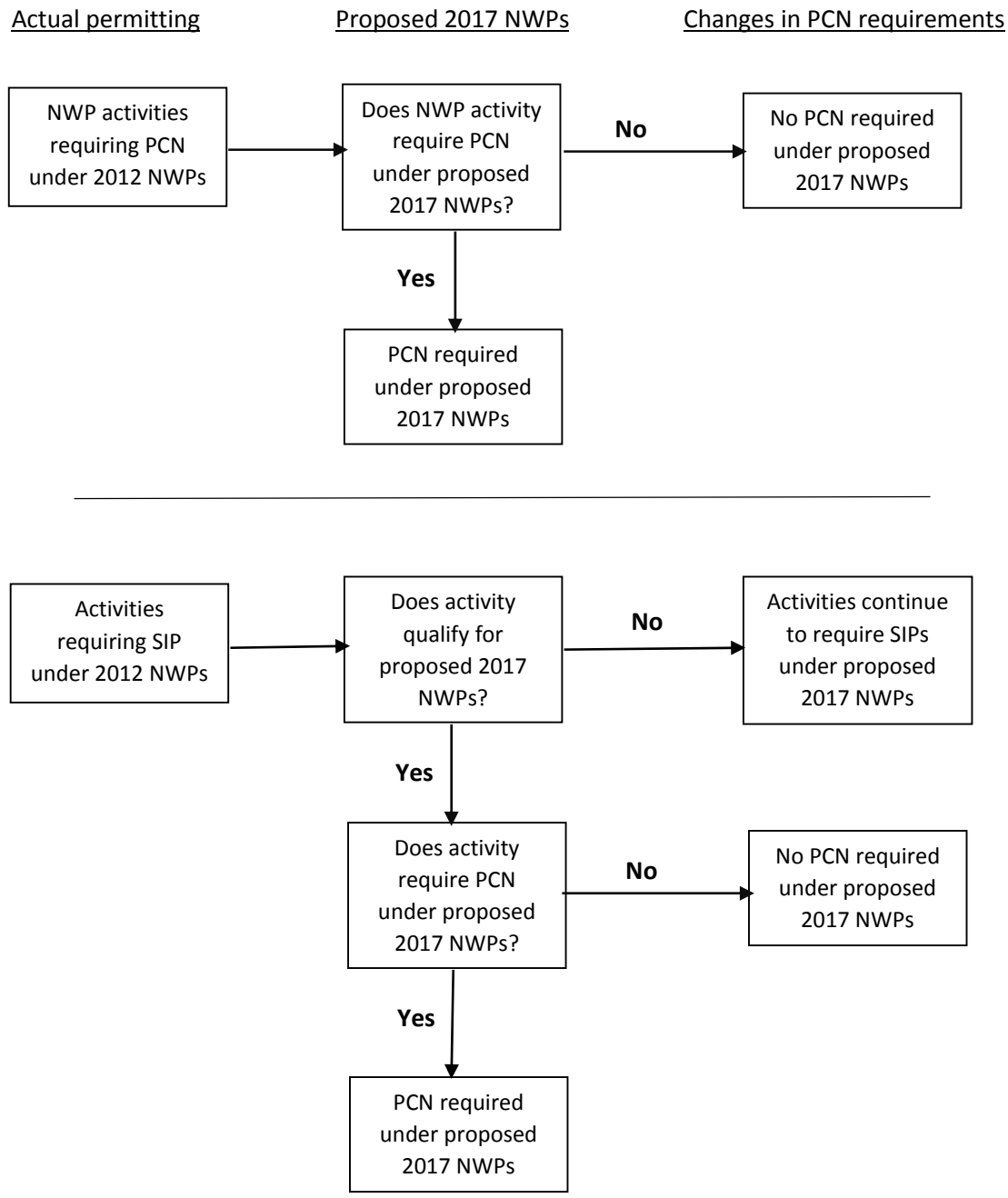


Table 3.1 provides a summary of the projected changes in NWP authorizations, NWP PCNs, and standard individual permits under the proposed 2017 NWPs after the screenings identified in Figures 3.1, 3.2, and 3.2 were conducted. The inclusion of authorization to remove structures and fills under NWP 3 is anticipated to result in a slight increase in the use of that NWP because most DA permits include conditions requiring removal of authorized activities if they are no longer being used for their intended purposes. The proposal to include the maintenance of bank stabilization activities in NWP 13 will shift some NWP 3 authorizations to NWP 13. The proposed addition of stream barbs to NWP 13 is also expected to result in a slight increase in the use of that NWP, with fewer standard individual permits being required.

Table 3.1. Summary table of proposed changes. See Appendix A for more detail.

Nationwide permit	Estimated changes in annual number of NWP PCNs submitted	Estimated changes in annual number of NWP authorizations	Estimated changes in annual number of SIP authorizations
NWP 3 – Maintenance	0	-275	-25
NWP 13 – Bank stabilization	0	+310	-10
NWP 21 – Surface coal mining activities	-5	-5	+5
NWP 33 – Temporary construction, access, and dewatering	-210	0	0
NWP 41 – Reshaping existing drainage ditches	-51	0	0
NWP 45 – Repair of uplands damaged by discrete events	+25	+25	-25
NWP 48 – Commercial shellfish aquaculture activities	-50	0	0
NWP 52 – Water-based renewable energy generation pilot projects	0	+1	-1
NWP A – Removal of low-head dams	+25	+25	-25
NWP B – Living shorelines	+200	+200	-200
GC 16 – Wild and scenic rivers	+5	0	0
Totals	**281**	**-60**	**-281**

The proposed modification of NWP 33 to remove the PCN requirement for temporary construction, access, and dewatering activities in Clean Water Act Section 404-only waters is expected to result in a decrease in the numbers of NWP 33 PCNs submitted each year. We are also proposing to remove the PCN requirement for NWP 41, which will also result in a decrease in the number of PCNs submitted each year. The proposal to allow district engineers to waive the 2-year deadline for requesting NWP 45 authorization to repair uplands damaged as a result of a storm or other discrete event is anticipated to shift a small number of activities from standard individual permit authorization to NWP authorization each year, because large storms

that would delay the ability to submit more timely PCNs are relatively rare. The proposed removal of the PCN threshold for commercial shellfish aquaculture activities involving dredge harvesting, harrowing, and tilling in areas inhabited by submerged aquatic vegetation is expected to result in a relatively small decrease in PCNs submitted each year, because many NWP 48 activities in submerged aquatic vegetation will still require PCNs because they might affect Endangered Species Act listed species and critical habitat. The proposed changes to NWP 52 to include floating solar panels and the proposal to remove the restriction to pilot projects is likely to result in a small shift in standard individual permit authorizations to NWP authorizations because of the limits on the number or size of permitted structures.

The two new proposed NWPs are expected to decrease the numbers of standard individual permit applications processed by Corps districts each year for these activities because of the availability of these NWPs if they are issued. The proposed revisions to clarify general condition 16 for NWP activities in Wild and Scenic Rivers or designated study rivers is anticipated to result in a small increase in PCNs each year.

4.0 Cost Estimates

Compliance costs are those costs incurred by regulated entities to comply with the permit requirements of Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. Compliance costs can be divided into two categories: (1) the direct costs to apply for a standard individual permit or request an NWP verification from the Corps, and (2) indirect (opportunity) costs. Direct costs reflect the out-of-pocket expenses necessary to complete permit applications (or prepare NWP PCNs or voluntary requests for NWP verifications) and comply with permit conditions, including any compensatory mitigation that might be required by the district engineer. For standard individual permits, compensatory mitigation may be required by the district engineer to offset significant resource losses (see 33 CFR 320.4(r)(2)). For activities authorized by NWPs, compensatory mitigation may be required by the district engineer to ensure the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3) and general condition 23).

The indirect costs of DA permitting represent other compliance costs that might not be reflected in out-of-pocket expenses. These include the costs associated with the length of time it takes to obtain standard individual permits or NWP verifications. They also include development profits that are not realized because the project proponent is required to redesign his or her project to minimize impacts to jurisdictional waters or wetlands or set aside land for compensatory mitigation.

Our assessment of compliance costs focuses primarily on the direct costs. While we recognize the importance of indirect costs, it is difficult to estimate those costs. Instead of attempting to quantify indirect costs, we provide a surrogate measure of indirect costs by examining the amount of time it takes to obtain either a standard individual permit or NWP verification under the alternatives examined in this RIA. Because of the challenges associated with quantitatively estimating those indirect costs, we do not attempt to analyze the indirect costs associated with the redesign of regulated activities to avoid and minimize impacts to jurisdictional waters and wetlands or loss in profits due to compensatory mitigation requirements.

The direct compliance costs were estimated by using two previous studies that examined the compliance costs associated with the NWP Program: the 2001 cost analysis for the 2000 NWPs conducted by the Institute for Water Resources (IWR 2001) and the Sunding-Zilberman (2002) study. The compliance costs estimated by these two studies were adjusted for inflation from 1999$ to 2015$ by using the Consumer Price Index (CPI-U).

We used the permitting change analysis discussed in Section 3.0 to calculate the changes in permitting that would result from two alternatives: (a) the finalization of the proposed 2017 NWPs, and (b) authorizing the activities authorized by the 2012 NWPs with standard individual permits if the 2017 NWPs are not issued. The baseline was the 2012 NWPs and the estimated annual numbers of NWP authorizations (both reporting and non-reporting activities), as well as activities authorized by standard individual permits intended to be authorized by the 2017 NWPs (e.g., removal of low-head dams, living shorelines, and other activities authorized by

changes to the NWPs). The reporting NWP activities include activities that required PCNs and activities where the project proponent requested a written NWP verification from the Corps district even though he or she was not required to submit a PCN.

4.1 Compliance Costs

4.1.1 Direct Compliance Costs

Many of the NWPs require project proponents to notify the appropriate Corps district before conducting the NWP activity, to provide the district engineer with an opportunity to review the proposed activity and determine whether it complies with all applicable terms and conditions, including regional conditions. In many cases where PCNs are not required, project proponents voluntarily seek confirmation from Corps districts that their proposed activities qualify for NWP authorization (voluntary PCNs). For the NWPs, the direct compliance costs are the costs required to prepare a PCN (required or voluntary). Table 4.1 summarizes the components of an NWP PCN and a standard individual permit application and the estimated range of costs. Table 4.1 is adapted from the cost analysis on the 2000 NWPs prepared by the Institute for Water Resources (2001) and the total permit costs are adjusted for inflation to 2015$ using the CPI-U).

Table 4.1 Estimated direct compliance costs, by permit type (does not include costs to implement compensatory mitigation, if required by district engineer) (from IWR (2001)).

Application Component	NWP PCN	SIP application (impacts up to 3 acres)
Delineation and survey of special aquatic sites	Cost depends on project area and the total length of impact areas. (Assumed 20-30 acre project site in 2001 study.) Engineering survey of impact areas (if required) would impose added costs.	Cost depends on project site area and length of impact areas. (Assumed 20-30 acre project site in 2001 study.) Engineering survey of impact areas (if required) would impose added costs.
Project/Impact Drawings	Prepare detailed plan views and cross sections (Cost depends on number of separate impact areas).	Prepare detailed plan views and cross sections (Cost depends on number of separate impact areas).
Alternatives Analysis	Discussion of on-site alternatives, e.g. site layout designs and engineering opportunities to avoid and minimize impacts.	On- and off-site alternatives analysis. Cost can be much higher for controversial projects.
Mitigation Proposal	Mitigation statement or conceptual mitigation plan if the project proponent needs to do mitigation to ensure no more than minimal adverse environmental effects. May also propose use of mitigation bank credits or in-lieu fee program credits, if available.	Mitigation statement or conceptual mitigation plan if the project proponent needs to do mitigation to ensure no more than minimal adverse environmental effects. May also propose use of mitigation bank credits or in-lieu fee program credits, if available
Application Submission	Cost to complete application that includes all PCN requirements.	Cost to complete application that includes all requirements.
Total Permit Cost for a Typical Project	**$4,308 to $14,358**	**$17,230 to $34,460**

Table 4.2 summarizes the direct compliance costs for the baseline (the 2012 NWPs plus SIPs that were required for activities that could be authorized by the 2017 NWPs) and two alternatives. Alternative 1 is the issuance of the proposed 2017 NWPs. Alternative 2 is the authorization of activities permitted by the 2012 NWPs if the 2017 NWPs are not issued. The low estimated annual compliance costs are based on the high end of the range of direct compliance costs estimated by the IWR (2001) cost analysis. The high estimated annual compliance costs are based on the direct compliance costs estimated by Sunding and Zilberman (2002, page 74) for a median impact acreage. Sunding and Zilberman (2002) calculated direct compliance costs for standard individual permits and NWPs by using a formula that takes into

account a base cost plus a cost per acre of waters of the United States impacted. To determine the median impact acreage, we used ORM2 data for authorized impacts for standard individual permits and NWPs issued between 2010 to 2014. The median acreage of authorized impact for standard individual permits during that time period was 1.47 acres. The median acreage of authorized impact for NWP verifications issued during 2010 to 2014 was 0.028 acre. These median impact acreages are provided in the third column of Table 5.2 for the purpose of applying the formula developed by Sunding and Zilberman (2002) and calculating the higher end of the direct compliance cost range.

Table 5.2. Direct compliance costs for the baseline and the two alternatives.

Scenario	Number of reported activities per year	2010 – 2014 median acreage impact	Unit costs from Corps' 2001 NWP analysis (2015$)	Unit costs from 2002 SZ study (2015$)	Estimated annual compliance costs (2015$ millions) Low	Estimated annual compliance costs (2015$ millions) High
Baseline. Current (2012) NWPs plus activities requiring SIPs that would be covered under proposed 2017 NWPs	31,555 PCNs and voluntarily reported activities plus 281 SIPs				$463	$801
Alternative 1. Issue the 2017 NWPs	31,490 PCNs and voluntarily reported activities plus 5 surface coal mining activities that will require SIPs	0.028	$14,358	$24,221 plus $13,332 per acre impacted	$452	$775
Alternative 2. Process standard individual permits instead of issuing the 2017 NWPs	49,556* (all PCNs and non-PCN activities require SIPs)	1.47	$34,460	$62,728 plus $16,939 per acre impacted	$1,708	$4,342

* Linear projects that were authorized by NWPs 12 and 14 were counted by Corps permit number. If a linear project is authorized by a standard individual permit, there is one Corps permit number in ORM2 for that linear project. Under the NWPs, each separate and distant crossing of waters of the United States for a linear project is authorized by an NWP 12 or 14, and all those NWP authorizations are recorded in ORM2 under a single Corps permit number for that linear project. In other words, for the purposes of Alternative 2, each linear project that was authorized by the 2012 NWPs (regardless of how many separate and distant crossings were authorized) is represented by a standard individual permit. because one individual permit would authorize all crossings of waters of the United States for a specific linear project. For linear projects authorized by NWPs 12 or 14, each separate and distant crossing of waters of the United States is authorized by NWP 12 or 14.

For Alternative 2, we used the median SIP authorized impact of 1.47 acres because not issuing the 2017 NWPs would likely eliminate incentives for project proponents to redesign their projects to qualify for the streamlined NWP authorization. This is likely to occur for activities subject to the 1/2-acre limit in NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52. In the absence of the NWPs, project proponents may design larger projects with potentially greater impacts to

jurisdictional waters and wetlands to offset opportunity costs associated with the standard individual permit process.

Under Alternative 1, the low estimated annual compliance costs would be reduced by $11 million per year compared to the baseline. The high estimated annual compliance costs would decrease by $26 million per year. Under Alternative 2, the low end estimated annual compliance costs would increase by $1,245 million per year, and the high end estimated annual compliance costs would increase by $3,541 million per year.

4.1.2 Indirect Costs

The indirect costs of complying with the permit requirements of Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 largely represent opportunity costs that are not necessarily reflected in out-of-pocket expenses. Opportunity costs include permitting time costs and any development values missed because of the requirements in the Corps' regulations to avoid and minimize impacts to jurisdictional waters and wetlands to the maximum extent practicable, and take other mitigation actions, such as on-site compensatory mitigation. Project proponents that use the NWPs accept some opportunity costs when they design their projects to qualify for the terms and conditions of the NWPs. Compared to the IWR (2001) cost analysis, indirect costs of on-site compensatory mitigation are expect to be less for the proposed 2017 NWPs because of the regulatory preference for off-site third party mitigation (i.e., mitigation banks and in-lieu fee programs) established in the Corps' 2008 mitigation regulation (see 33 CFR 332.3(b)). The IWR (2001) cost analysis examined on-site compensatory mitigation as an opportunity cost.

The proposed 2017 NWPs are not expected to increase the indirect costs of permitting because more activities would be authorized by NWP compared to the 2012 NWPs. While we recognize the importance of incremental indirect costs, estimation of these costs is complicated by a variety of factors, such as regional differences in economic settings, land values, and aquatic resource abundance and distribution. Indirect costs may also be affected by the presence or absence of state and local government programs that regulate impacts to aquatic resources. Indirect costs may also be affected by other factors. The data and level of analysis needed to adequately assess indirect costs are beyond the time and resources available for this RIA.

As an alternative to a direct approach to estimating indirect costs, we examine whether the alternatives considered in this RIA would affect permitting times. The presumption is that longer permitting times will result in greater opportunity costs. In other words, the opportunity costs result from delays in project implementation caused by the time it takes to receive a standard individual permit or an NWP verification from the Corps.

Permitting times can be represented in two ways: (1) the time it takes the Corps to make a permit decision after it receives a complete standard individual permit application or NWP PCN (required or voluntary), or (2) the time it takes the Corps to make a permit decision after it receives a standard individual permit application or NWP PCN (required or voluntary) from the

project proponent. The latter better represents the project proponent's perspective of permitting time.

The evaluation days are the number of days between the date a complete standard individual permit application or NWP verification request is received by the Corps district and the date the standard individual permit decision is made or the date the NWP verification letter is issued. The information necessary for a complete standard individual permit application is described at 33 CFR 325.1(d). When the Corps district first receives a standard individual permit application or NWP PCN (required or voluntary), the Corps district staff reviews the application or NWP verification request and determines whether it contains the required information to be a complete application or NWP verification request. The information necessary for a complete NWP PCN is described in paragraph (b) of general condition 32. Application days are the number of days between the date of initial receipt of an SIP application or NWP PCN and the date the SIP or NWP verification letter is issued.

Once the Corps district receives the information necessary to make the application or verification request complete, it will begin its evaluation of the proposed activity. If it is an individual permit application, when a complete application is received the Corps district issues a public notice to solicit comment on the proposed activity that requires Department of the Army authorization. If it is an NWP PCN and the proposed activity requires agency coordination (see paragraph (d) of general condition 32), the Corps district immediately sends copies of the PCN to the U.S. Fish and Wildlife Service, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the National Marine Fisheries Service. Those agencies have no more than 25 days to submit substantive, site-specific comments to the district engineer explaining why the agency believes the adverse environmental effects will be more than minimal.

Table 4.3 compares Alternatives 1 and 2 to the baseline, in terms of the total number of days each year it would take the Corps to make decisions on standard individual permit applications or NWP PCNs. Table 4.3 examines both evaluation days (days to decision on a complete standard individual permit application or required or voluntary NWP PCN) and application days (days to decision on a submitted standard individual permit application or required or voluntary NWP PCN). The comparison to the baseline for each alternative indicates a general increase or decrease in opportunity costs, based on the assumption that the mean processing times would not change under either alternative. The comparisons in Table 4.3 are for illustrative purposes, to show the substantial differences in opportunity costs between the two alternatives. The calculations presented in Table 4.3 do not take into account the probable increases in evaluation days or application days likely to result from backlogs of standard individual permit applications caused by the significant increase in those standard individual permit applications under Alternative 2.

Table 4.3. Evaluation Days and Application Days for the Alternatives Compared to the Baseline (opportunity costs quantified in days). Total evaluation days and application days based on the mean processing times for NWP verification requests and standard individual permits for FY 2015 (from Table 1.2). This table only includes changes in the numbers of standard individual permits processed each year under the various scenarios (the baseline and two alternatives. This table does not include the 1,694 standard individual permits issued in FY 2015) for other activities.

Scenario	Number of NWPs PCNs per year	Number of SIPs per year	Total Evaluation Days per Year	Annual Difference from Baseline (Days)	Total Application Days per Year	Annual Difference from Baseline (Days)
Baseline: 2012 NWPs	31,555	281	1,353,000		2,796,000	
Alternative 1 – 2017 NWPs	31,490	5	1,292,000	-61,000	2,710,000	-86,000
Alternative 2 – SIPs instead of 2017 NWPs	0	49,556	10,446,000	9,093,000	14,421,000	11,625,000

Alternative 1 (i.e., the proposed 2017 NWPs) is expected to result in an overall decrease in both total evaluation days per year and total application days per year. Therefore, opportunity costs will be less under Alternative 1 compared to the baseline. Alternative 2 (i.e., authorize activities authorized by the 2012 NWPs with standard individual permits) would substantially increase opportunity costs because of the increased time required to reach permit decisions.

4.2 Administrative Costs

The Corps incurs administrative costs when it processes required or voluntary NWP PCNs or standard individual permit applications. Administrative costs vary by permit type, as well as the type of activity requiring Department of the Army authorization and the complexity of those activities. All other factors being equal, the proposed 2017 NWPs would affect the Corps administrative costs by changing the total number of NWP PCNs and standard individual permits applications received, and the relative proportions of those NWP PCNs and standard individual permit applications.

To estimate the changes in Corps administrative costs for the two alternatives relative to the baseline, we used the administrative costs calculated in the Institute for Water Resource's cost analysis for the 2000 NWPs (IWR 2001) and adjusted those costs for inflation to 2015$ using the CPI-U. In the IWR (2001) cost analysis, the average administrative costs to the Corps were estimated to be $1,492 per standard individual permit and $389 per NWP PCN (required or

voluntary). Adjusted to account for inflation as 2015$, the Corps' administrative costs would be $2,142 per standard individual permit application and $559 per NWP PCN. These administrative costs do not include the costs associated with reviewing and approving a compensatory mitigation plan that fulfills the requirements in 33 CFR 332.4(c). During the period of 2010 to 2014, compensatory mitigation was required for approximately 11 percent of verified NWP activities and approximately 49 percent of activities authorized by standard individual permits (IWR 2015).

Table 4.4 provides estimates of the Corps' administrative costs for the baseline and the two alternatives examined in this RIA.

Table 4.4 Estimate of annual Corps administrative costs for implementing the 2012 NWPs and the two alternatives. This table only includes changes in the numbers of standard individual permits processed each year under the various scenarios (the baseline and two alternatives). This table does not include the 1,694 standard individual permits issued in FY 2015 for other activities.

Scenario	Number of NWP PCNs (required and voluntary) processed by the Corps each year	Number of standard individual permits processed by the Corps each year	Administrative costs incurred by the Corps each year (millions 2015$)	Difference from the baseline (millions 2015$)
Baseline: 2012 NWPs	31,555	281	$18.2	
Alternative 1 – 2017 NWPs	31,490	5	$17.6	-$0.6
Alternative 2 – SIPs instead of the 2017 NWPs	0	49,556	$106.1	+$87.9

Compared to the baseline, Alternative 1 would reduce the administrative costs by approximately $600,000 per year. Under Alternative 2, the Corps' administrative costs would increase by $87,900,000 per year relative to the baseline.

5.0 Benefit-Cost Analyses

5.1 Introduction

One of the benefits of the NWP Program is that the NWPs encourage project proponents that conduct activities that require Department of the Army (DA) authorization to avoid and minimize impacts to jurisdictional waters and wetlands to qualify for NWPs instead of applying for standard individual permits with potentially higher proposed impacts to jurisdictional waters and wetlands. Project proponents requiring DA authorization benefit from the NWP Program because it allows them to obtain the required authorizations in much less time than it takes to complete the standard individual permit process. In addition, as explained above, there are lower compliance costs associated with the NWPs than with standard individual permits.

Table 5.1 provides data from the most recent wetlands status and trends report published by the U.S. Fish and Wildlife Service.

Table 5.1. Estimated aquatic resource acreages in the conterminous United States in 2009 (Dahl 2011).

Aquatic Habitat Category	Estimated Area in 2009 (acres)
Marine intertidal	227,800
Estuarine intertidal non-vegetated	1,017,700
Estuarine intertidal vegetated	4,539,700
All intertidal waters and wetlands	5,785,200
Freshwater ponds	6,709,300
Freshwater vegetated	97,565,300
• Freshwater emergent wetlands	27,430,500
• Freshwater shrub wetlands	18,511,500
• Freshwater forested wetlands	51,623,300
All freshwater wetlands	104,274,600
Lacustrine deepwater habitats	16,859,600
Riverine deepwater habitats	7,510,500
Estuarine subtidal habitats	18,776,500
All wetlands and deepwater habitats	153,206,400

Leopold, Wolman, and Miller (1964) estimated that there are approximately 3,250,000 miles of river and stream channels in the United States. This estimate is based on an analysis of 1:24,000 scale topographic maps. Their estimate does not include many small streams. Many small streams, especially headwater streams, are not mapped on 1:24,000 scale U.S. Geological

Survey (USGS) topographic maps (Leopold 1994) or included in other inventories (Meyer and Wallace 2001), including the National Hydrography Dataset (Elmore et al. 2013). Many small streams and rivers are not identified through maps produced by aerial photography or satellite imagery because of inadequate image resolution or trees or other vegetation obscuring the visibility of those streams from above (Benstead and Leigh 2012). In a study of stream mapping in the southeastern United States, only 20 percent of the stream network was mapped on 1:24,000 scale topographic maps, and nearly none of the observed intermittent or ephemeral streams were indicated on those maps (Hansen 2001). Another study in Massachusetts showed that those types of topographic maps exclude over 27 percent of stream miles in a watershed (Brooks and Colburn 2011). For a 1:24,000 scale topographic map, the smallest tributary found by using 10-foot contour interval has a drainage area of 0.7 square mile and length of 1,500 feet, and smaller stream channels are common throughout the United States (Leopold 1994). Benstead and Leigh (2012) found that the density of stream channels (length of stream channels per unit area) identified by digital elevation models was three times greater than the drainage density calculated by using USGS maps. Elmore et al. (2013) made similar findings in watersheds in the mid-Atlantic, where they determined that the stream density was 2.5 times greater than the stream density calculated with the National Hydrography Dataset. Due to the difficulty in mapping small streams, there are no accurate estimates of the total number of river or stream miles in the conterminous United States that might be considered as "waters of the United States."

The quantities of the Nation's aquatic resources presented by these studies are underestimates, because these national inventories do not include many small wetlands and streams. The U.S. Fish and Wildlife Service's status and trends study does not include Alaska, Hawaii, or the territories. The underestimate of national wetland acreage by the USFWS status and trends study and the National Wetland Inventory is primarily the result of the minimum size of wetlands detected through remote sensing techniques and the difficulty of identifying certain wetland types through those remote sensing techniques. The remote sensing approaches used by the U.S. Fish and Wildlife Service for its National Wetland Inventory maps and its status and trends reports result in errors of omission that exclude wetlands that are difficult to identify through photointerpretation (Tiner 1997a). These errors of omission are due to wetland type and the size of target mapping units (Tiner 1997a). Therefore, it is important to understand the limitations of the source data when describing the environmental baseline for wetlands using maps and studies produced by remote sensing, especially in terms of wetland quantity, and making inferences from those inventories.

Factors affecting the accuracy of wetland maps made by remote sensing include: the degree of difficulty in identifying a wetland, map scale, the quality and scale of the source information (e.g., aerial or satellite photos), the environmental conditions when the source information was obtained, the time of year source information was obtained, the mapping equipment, and the skills of the people producing the maps (Tiner 1999). The map scale usually affects the target mapping unit, which is the minimum wetland size that can be consistently mapped (Tiner 1997b). In general, wetland types that are difficult to identify through field investigations are likely to be underrepresented in maps made by remote sensing (Tiner 1999). Wetlands difficult

to identify through remote sensing include forested wetlands, small wetlands, narrow wetlands, mowed wetlands, farmed wetlands, wetlands with hydrology at the drier end of the wetland hydrology continuum, and significantly drained wetlands (Tiner 1999). In the most recent wetland status and trends report published by the U.S. Fish and Wildlife Service, the target minimum wetland mapping unit was 1 acre, although some easily identified wetlands as small as 0.1 acre were identified in that effort (Dahl 2011). The National Wetland Inventory identifies wetlands regardless of their jurisdictional status under the Clean Water Act (Tiner 1997b).

Another important consideration for determining whether the activities authorized by NWPs result in no more than minimal adverse environmental effects is the condition of the waters and wetlands that might be affected by NWP activities and activities authorized by other types of DA permits. A wide variety of activities affect the quantity and quality of aquatic resource, such as changes in land use and land cover, introductions of alien species, overexploitation of species, pollution, eutrophication due to excess nutrients, resource extraction, water withdrawals, climate change, and various natural disturbances (MEA 2005). The USFWS status and trends study does not assess the condition or quality of wetlands and deepwater habitats (Dahl 2011). Information on water quality in waters and wetlands, as well as the causes of water quality impairment, is collected by the U.S. EPA under sections 305(b) and 303(d) of the Clean Water Act. Table 5.2 provides U.S. EPA's most recent national summary of water quality in the Nation's waters and wetlands (EPA 2015).

Table 5.2. National summary of water quality data (U.S. EPA 2015).

Category of water	Total waters	Total waters assessed	Percent of waters assessed	Good waters	Threatened waters	Impaired waters
Rivers and streams	3,533,205 miles	1,046,621 miles	29.6	476,765 miles	7,657 miles	562,198 miles
Lakes, reservoirs and ponds	41,666,049 acres	17,904,395 acres	43.0	5,658,789 acres	145,572 acres	12,100,034 acres
Bays and estuaries	87,791 square miles	33,402 square miles	38.0	7,291 square miles	0 square miles	26,111 square miles
Coastal shoreline	58,618 miles	8,162 miles	13.9	900 miles	0 miles	7,262 miles
Ocean and near coastal waters	54,120 square miles	1,674 square miles	3.1	616 square miles	0 square miles	1,058 square miles
Wetlands	107,700,000 acres	1,112,438 acres	1.0	573,947 acres	0 acres	538,492 acres
Great Lakes shoreline	5,202 miles	4,431 miles	85.2	78 miles	0 miles	4,353 miles
Great Lakes open waters	60,546 square miles	53,332 square miles	88.1	62 square miles	0 square miles	53,270 square miles

According to the latest U.S. EPA national summary (U.S. EPA 2015), 54% of assessed rivers and streams, 68% of assessed lakes, reservoirs, and ponds, 78% of assessed bays and estuaries, 89% of assessed coastal shoreline, 63% of assessed ocean and near coastal waters, and 48% of assessed wetlands are impaired.

Activities authorized by the 2017 NWPs will adversely affect a smaller proportion of the Nation's wetland base than indicated by the wetlands acreage estimates provided in the most recent status and trends report, or the National Wetland Inventory maps for a particular region. Appendix B contains estimates of the projected annual impacts to jurisdictional waters and wetlands expected to occur under the proposed 2017 NWPs. The estimated annual impacts that would be authorized by all 52 NWPs is approximately 20,300 acres per year. If NWPs 27 and 48 are excluded, the estimated annual impacts to waters and wetlands is approximately 5,500 acres per year. NWP 27 authorizes aquatic resources restoration, enhancement, and establishment activities and those activities must result in net gains in aquatic resource functions and services. The commercial shellfish aquaculture activities authorized by NWP 48 do not result in losses of jurisdictional waters and wetlands and the areas affected by these aquaculture activities continue to provide important ecological functions and services because they are production ecosystems.

The impacts provided in Appendix B include both permanent and temporary impacts and permanent impacts do not necessarily result in a loss of jurisdictional waters and wetlands

because many activities authorized by NWPs do not convert waters and wetlands to uplands or built structures. Therefore, actual losses of waters and wetlands resulting from the activities authorized by the proposed NWPs will be smaller than the estimates provided above. When considering these estimated annual impacts in the context of the baseline quantity of the Nation's aquatic resources, it is important to remember that the inventories cited above do not include all of those aquatic resources because many headwater streams and many wetlands of various sizes and types are not included in these inventories because of mapping limitations. Another important consideration is that the impacts to jurisdictional waters and wetlands authorized by NWPs are scattered across the country (which is 2,264,000,000 acres in size) as small, discrete impacts throughout the country. Cumulative impacts are more effectively considered at smaller geographic scales, such as watersheds, ecoregions, counties, states, or Corps districts.

The NWPs provide an important benefit by encouraging project proponents to minimize impacts to jurisdictional waters and wetlands to qualify for NWP authorization so that they can receive the required DA authorization. As shown in Table 1.2, the mean time to receive a permit decision from the Corps after submitting an NWP PCN or an individual permit application is 86 days and 291 days, respectively.

To demonstrate the benefits in aquatic resource protection provided through the minimization done to qualify for NWP authorization, we examine the median authorized impact for activities authorized by the NWPs with 1/2-acre limits (i.e., NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52), versus the median authorized impact for activities authorized by standard individual permits. We did not include NWP 14 because it has a 1/2-acre limit for losses of non-tidal waters and a 1/3-acre limit for losses of tidal waters. We did not include the NWPs without acreage limits because those NWPs are either self-limiting by the nature of the authorized activity (e.g., single non-commercial mooring buoy authorized by NWP 10) or they authorized activities with net environmental benefits (e.g., NWP 27 activities that restore wetlands and streams). As stated in section 4.1, during the period of 2010 to 2014 the median authorized fill impact for standard individual permits was 1.47 acre. During that same time period, the median authorized fill impact for NWPs 21(b), 29, 39, 40, 42, 43, 44, 50, 51, and 52 was 0.09 acre. NWP 21, which authorizes discharges of dredged of fill material into waters of the United States associated with surface coal mining activities was limited in this analysis to NWP 21(b) activities authorized under the 2012 NWPs because NWP 21(b) has a 1/2-acre limit. Surface coal mining activities previously authorized under the 2007 NWP 21 could be reauthorized under the 2012 NWP 21(a) without an acreage limit as long as there was no increase in impacts to waters of the United States. There were only approximately 7 NWP 21(b) activities authorized each year, and we expect that trend to continue with the 2017 NWP 21. We acknowledge that this approach overestimates the impacts to jurisdictional waters and wetlands that might occur if the NWPs are not reissued and project proponents would have to obtain Department of the Army authorization through the standard individual permit process, which has no acreage limits. But it is difficult to predict what permit applicants might propose in terms of impacts to jurisdictional waters and wetlands if the NWPs are not available to provide incentives for regulated entities to avoid and minimize impacts to jurisdictional waters and wetlands to obtain

NWP authorization. Potential compensatory mitigation requirements can also drive additional avoidance and minimization because project proponents often seek ways to reduce overall project costs, and compensatory mitigation requirements impose additional costs on project proponents.

If the NWPs are not reissued, we expect that many project proponents would apply for standard individual permits with higher proposed impacts to jurisdictional waters and wetlands. They are likely to do this because they will have lost the time savings associated with NWP authorizations, and they may propose larger projects to minimize their opportunity costs. If NWPs 21(b), 29, 39, 40, 42, 43, 44, 50, 51, and 52 are not reissued, and project proponents conducting these types of activities are required to apply for standard individual permits, we estimate that the impacts to jurisdictional waters and wetlands would potentially be 2,831 acres per year (1,926 activities per year times 1.47 acres). This estimate does not take into account activity-specific avoidance and minimization that would be required by the district engineers when he or she evaluates the standard individual permit application. It is not possible to take activity-specific factors into account when doing a national-scale analysis. If the 2017 NWPs are reissued, the activities authorized by NWPs 21 (the 2012 NWP 21(b) is proposed to become the 2017 NWP 21), 29, 39, 40, 42, 43, 44, 50, 51, and 52 would be estimated to impact 173 acres of jurisdictional waters and wetlands each year (1,926 activities per year times the median impact acreage of 0.09 acre for those NWPs).

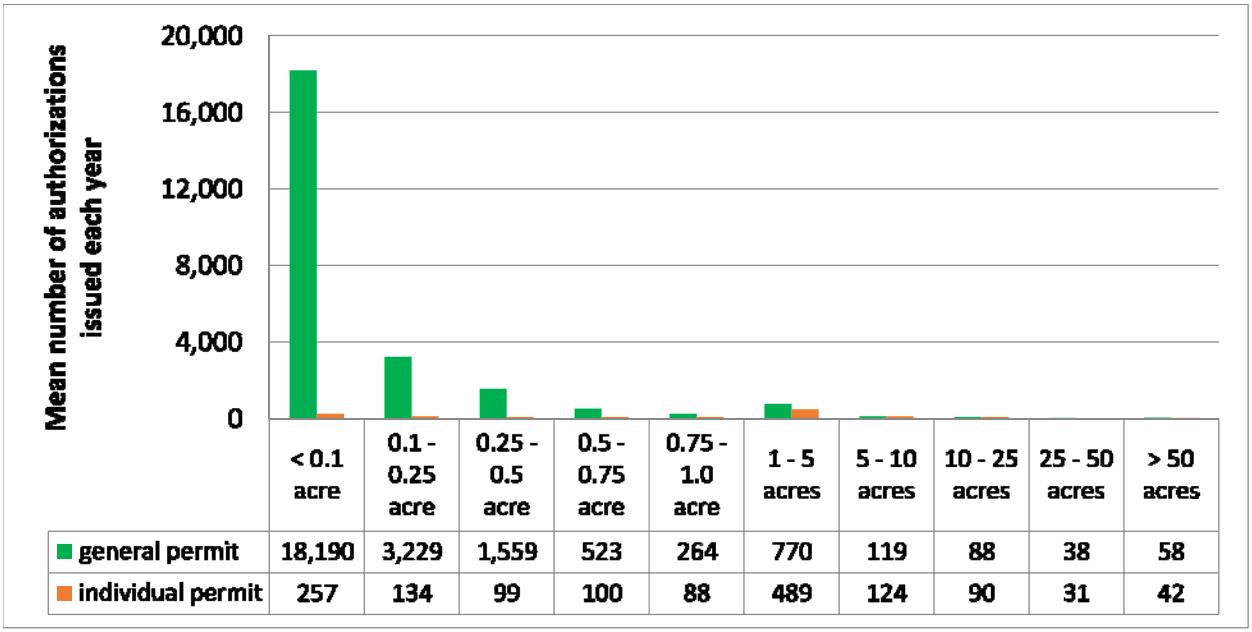
Not reissuing NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 would likely result in greater annual acreages of authorized impacts to jurisdictional waters and wetlands because standard individual permits have no acreages limits. The acreage of authorized impacts for standard individual permits is the result of project-specific analyses that are required for standard individual permits, including the avoidance, minimization, and compensatory mitigation requirements driven by 33 CFR part 320.4(r) and the 404(b)(1) Guidelines. If the district engineer determines compensatory mitigation is required for the standard individual permit, the permittee must also comply with the applicable requirements in 33 CFR part 332. Given the uncertainty in potential authorized impact acreages resulting from the issuance of standard individual permits if the NWPs are not reissued, it is not possible to estimate what mean annual increase in acreage impacts to jurisdictional waters and wetlands would result if the NWPs are no longer available. These calculations demonstrate some of the benefits the NWPs provide in terms of protecting the functions and services provided by the Nation's wetlands, streams, and other types of aquatic ecosystems while allowing certain types of economic development that provides other important services to our nation's citizens.

This analysis focuses on avoidance and minimization because compensatory mitigation is only considered after all appropriate and practicable avoidance and minimization to jurisdictional waters and wetlands has been achieved. Paragraph (a) of general condition 23 requires project proponents to avoid and minimize impacts (both permanent and temporary) to jurisdictional waters and wetlands to the maximum extent practicable at the project site. For the NWPs, compensatory mitigation is only required for a specific NWP activity when it is determined by the district engineer to be necessary to comply with the "no more than minimal adverse

environmental effects" requirement (see 33 CFR 330.1(e)(3)). The majority of activities verified by district engineers as qualifying for NWP authorization do not require compensatory mitigation because the district engineer determined when reviewing the PCN that those activities result in no more than minimal individual and cumulative adverse environmental effects after considering the factors in paragraph 2 of section D, District Engineer's Decision.

Figure 5.1 provides additional evidence that permit applicants design their projects to minimize the impacts of regulated activities in jurisdictional waters and wetlands to qualify for general permit authorization. The acreage of authorized impacts includes both permanent and temporary impacts. The vast majority of authorized impacts are less than 1/10-acre, below the 1/10-acre threshold in paragraph (c) of general condition 23 for requiring compensatory mitigation for wetland losses. The larger impacts authorized by NWP shown in Figure 5.1 are due to the use of NWPs that have no acreage limits, especially NWPs 27, 38, and 48. Nationwide permit 27 authorizes aquatic resource restoration, establishment, and enhancement activities. Nationwide permit 38 authorizes discharges of dredged or fill material into waters of the United States and structures or work in navigable waters of the United States for the cleanup of hazardous and toxic waste. Nationwide permit 48 authorizes activities regulated under section 404 and/or section 10 associated with commercial shellfish aquaculture activities. Activities authorized by NWPs 27 result in environmental improvements by providing net increases in aquatic resource functions and services. Activities authorized by NWP 38 improve the environment by removing or remediating hazardous and toxic substances. Nationwide permit 48 activities increase local shellfish populations in coastal waters, which provide a variety of ecosystem functions and services. In coastal waters inhabited by eelgrass and other types of submerged aquatic vegetation, there is some competition for space by shellfish and seagrasses, but those organisms generally co-exist in robust populations (Dumbauld et al. 2015).

Figure 5.1 Authorized impacts to jurisdictional waters and wetlands, in acreage range categories (2010 to 2014).



	< 0.1 acre	0.1 - 0.25 acre	0.25 - 0.5 acre	0.5 - 0.75 acre	0.75 - 1.0 acre	1 - 5 acres	5 - 10 acres	10 - 25 acres	25 - 50 acres	> 50 acres
general permit	18,190	3,229	1,559	523	264	770	119	88	38	58
individual permit	257	134	99	100	88	489	124	90	31	42

In the remainder of this section, we provide a qualitative benefit-cost analysis. We use a qualitative approach because of the substantial challenges of doing a quantitative benefit-cost analysis for the aquatic resources potentially affected by activities authorized by the new and modified NWPs. While the removal of low-head dams authorized by the proposed NWP A will result in some increases in riverine and riparian functions and services, the projected increase is difficult to estimate because the functions and services provided by rivers and streams are strongly influenced by the condition of their watersheds (e.g., Allan 2004) and full ecological recovery is generally not expected after low-head dam removal (Doyle et al. 2005) because of changes to the watershed that occurred after the low-head dam was constructed. The activities authorized by proposed NWP B for the construction and maintenance of living shorelines are expected to provide some ecological functions and services, living shorelines do not provide functions and services at the same level as natural fringe wetlands, vegetated shallows, and other intertidal and subtidal habitats (NRC 2007).

We are providing a brief qualitative benefit-cost analysis for the two proposed new NWPs. If issued, these NWPs will authorize activities that were usually authorized by standard individual permits. Some Corps districts may have regional general permits that authorize these activities.

5.2 Proposed New NWP A – Removal of Low-Head Dams

5.2.1 Baseline

There are approximately 1,000,000 (Allan and Castillo 2007) to 2,000,000 (Graf 1993) small dams in the United States, an undetermined percentage of which are low-head dams (Tschantz and Wright 2011). Most rivers in the continental United States are altered by dams of various sizes, and the characteristics of those dams vary widely in terms of their size, purpose, and how they operate (Allan and Castillo 2007). Most low-head dams were constructed across rivers to increase the water level to provide water for towns and cities, and industries (Tschantz and Wright 2011). Many of those low-head dams were built in the 19th century, and have deteriorated or been abandoned (Tschantz and Wright 2011, Tschantz 2014). Most small dams are likely to be in need of repair or have been abandoned (Poff and Hart 2002). As of 1995, the average age of dams in the United States was 40 years, and many need to be repaired for public safety reasons (Shuman 1995).

Dams can be classified in a functional perspective as storage dams or run-of-the-river dams (Poff and Hart 2002). Storage dams have large hydraulic heads and storage volumes, long hydraulic residence times, and strong controls over water releases from the dam (Poff and Hart 2002). Run-of-the-river dams have small hydraulic heads and storage volumes, short residence times, and there is little or no control of the rate at which water is released from these dams (Poff and Hart 2002). Low-head dams are a category of run-of-the river dams and they have small storage capacities (Tschantz and Wright 2011, Csiki and Rhoads 2014).

Dams adversely affect river and stream functions by altering riverine hydrologic, sediment transport, and nutrient cycling processes, changing the structure and dynamics of riverine and riparian habitats, changing water temperatures, and posing barriers to movements of organisms and nutrients (Poff and Hart 2002, Allan and Castillo 2007). Dams also affect the flooding regimes of rivers and streams, and alter the ecological processes that occur in floodplains, adversely affecting species that relying on that periodic flooding (Allan and Castillo 2007). Removing dam structures can reverse their impacts to a large degree and allow the affected river or stream to recover its structure and function (Bednarek 2001).

Run-of-the river dams have little effect on peak water flows or downstream sediment transport, but they still block fish migrations (Poff and Hart 2002, Allan and Castillo 2007). Low-head dams act as barriers to movements of some, but not all, species of fish and aquatic invertebrates, especially upstream macroinvertebrates (Stanley et al. 2002). Low-head dams do not store much sediment because sediment continues to be transported past the dam structure during high flows (Fencl et al. 2015, Csiki and Rhoads 2014).

Dam removal should be viewed in its trade-offs, with some beneficial outcomes and some detrimental outcomes (Stanley and Doyle 2003, Doyle et al 2005). As of 2014, approximately 1,100 dams have been removed (East et al. 2015, Lovett 2014). Most of the dams that have

been removed to date are small dams (Lovett 2014, Stanley and Doyle 2003), although a few larger dams have been removed (e.g., East et al. 2015).

5.2.2 Benefits

The removal of low-head dams provides a number of benefits, especially the restoration of riverine functions and services, including more natural river flows, increased connectivity of the river and stream network, and the re-establishment of migratory habitats and routes aquatic organisms. The removal of low-head dams also helps improve public safety, for the users of small craft such as canoes and kayaks, and for local residents that might be adversely affected when an old or deteriorated dam structure fails. Many dams are removed because it is more costly to repair those dams to make them compliant with current safety and environmental requirements (Lovett 2014). Low-head dams are also removed because those dams pose dangers to swimmers, kayakers, canoeists, rafters, and other users of these waterways (Tschantz and Wright 2011).

Low-head dams do not substantially alter the passage of peak flows over the dam structure or store fine sediments to which contaminants adhere (Poff and Hart 2002). During high flows, sediment from upstream of the dam structure are transported over the low-head dam, which prevents the impoundment from filling with sediment (Fencl et al. 2015, Csiki and Rhoads 2014). We are proposing to limit this NWP to the removal of dams that have small sediment storage capacities so that sediment releases resulting from dam removal will be minor and there will only be minimal adverse effects downstream of the dam removal. Because only small amounts of sediment will be released, and low-head dams do not store finer sediment that can have contaminants adsorbed to them, downstream contaminant transport will generally not be an issue associated with the removal of these low-head dams.

Rate of recovery after dam removal is dependent on dam size, river size, channel shape, sediment volume, and grain size (O'Connor et al. 2015). Different riverine ecosystem attributes recover at different rates after dam removal, with macroinvertebrate populations recovering the fastest, and the reestablishment of riparian forests taking the longest time because trees take years to grow from seedlings to mature trees (Doyle et al. 2005). Migratory fish have been observed to rapidly use the increased river connectivity that is regained after the dam structure is removed (O'Connor et al. 2015, Lovett 2014). In general, after dam removal sediment is redistributed throughout the downstream segments within months (O'Connor et al. 2015). Water quality generally improves after dam removal, by restoring nutrient cycling and reducing the potential for eutrophication to occur (Born et al. 1998).

When examining the removal of a low-head dam in Wisconsin, Stanley et al. (2002) found that the river recovered rapidly after the removal of the dam structure. They observed that most of the geomorphic changes occurred in the river segment in the former impoundment, and that within one year macroinvertebrate communities in the area that was impounded became similar to the macroinvertebrate communities found in downstream reference reaches. Stanley

et al. (2002) attributed the rapid recovery of the river to the small amount of time it took channel development in the former impoundment area to occur and the small amount of sediment stored in the low-head dam.

The removal of low-head dams benefits public safety because those dams create safety hazards. Low-head dams are hazardous because they create hydraulic pumps with dangerous currents that can trap boaters and swimmers on the downstream side of the dam, causing them to drown (Tschantz and Wright 2011, Tschantz 2014). Since the 1960s, there have been hundreds of deaths caused by low-head dams (Tschantz 2014).

The removal of low-head dams provide benefits to people who favor ecosystem restoration activities, such as members of environmental groups and natural resource agencies (Born et al. 1998). The removal of these dams may also be preferred by communities and dam owners because they no longer have to pay the costs of dam repair and maintenance (Born et al. 1998). There are trade-offs associated with low-head dam removal, with gains in recreation and aesthetics values for those people who prefer free-flowing rivers versus losses in recreation and aesthetics values for those people who prefer man-made impoundments (Born et al. 1998).

5.2.3 Costs

There are some costs associated with dam removal, including low-head dam removal. There are also trade-offs in the types and amounts of ecosystem functions and services as dams are removed and the lentic habitats associated with impoundments are replaced with the lotic habitats associated with flowing rivers and streams. Other costs include the amount of time it takes the river or stream to recover after the dam structure is removed and the adverse environmental effects that occur as a result of the removal of the dam structure. Fringe wetlands that may have developed around the impoundment may be converted to non-wetland riparian areas after the dam structure is removed.

The removal of low-head dams imposes costs to citizens that use impoundments for sportfishing, where the impoundments provide habitat for fish species that prefer to live in lakes and ponds (Born et al. 1998). After the low-head dam is removed they would have to find other places to fish. The removal of those dams also impose costs on property owners who live next to those impoundments, if they prefer the aesthetics and recreational opportunities associated with these impoundments (Born et al. 1998), setting aside from the dangers created by low-head dam that are described by Tschantz and Wright (2011) and Tschantz (2014). On the other hand, people who own land next to the impoundment may gain additional riparian lands after the dam structure is removed (Born et al. 1998), and they might be able to use that land for agriculture or other purposes.

There are short-term adverse effects that result from the removal of low-head dams, but over the long term the functions and structure of rivers and streams will recover and improve (Stanley et al. 2002). Riverine functions and structure will perform at higher levels, but they are

unlikely to recover to the extent that existed prior to the construction of the low-head dam because of changes to the watershed that occurred while the low-head dam was in place (Doyle et al. 2005). The ecological responses to dam removal are highly dependent on site-specific circumstances, and the trade-offs associated with a particular dam removal also vary by local site conditions (Stanley and Doyle 2003). Examples of important influences to consider are the size and configuration of the dam, geology, sediment characteristics, and the species inhabiting the affected waterbodies (Stanley and Doyle 2003).

For small dams, there is not much stored sediment and after the dam structure is removed that sediment usually moves downstream quickly (Stanley and Doyle 2003, Gregory et al. 2002). Low-head dams store little sediment because during high river or stream flows, sediment from the impounded area is transported over the dam structure, preventing the impoundment from filling with sediment (Fencl et al. 2015, Poff and Hart 2002, Csiki and Rhoads 2014).

Removal of large dams usually takes longer to recover than removal of small dams (O'Connor et al. 2015). Most river and stream geomorphic adjustments to dam removal occur within 1 to 5 years, and that rate of recovery is similar to the rate of geomorphic recovery after occurs after landslides, floods, or channelization occur in rivers (Doyle et al. 2005). The rate of ecological recovery is linked to the rate of geomorphic recovery (Doyle et al. 2005).

Not removing low-head dams and leaving them in place can pose more costs to society because riverine functions and services will continue to be impaired by those dams and the costs of repairing or replacing the dam structure to conform with current requirements and standards can be very high (Stanley and Doyle 2003). The costs of repairing or replacing the dam structure can be three times the costs of removing the dam (Born et al. 1998). When considering the costs necessary to repair or replace a dam to meet current safety standards and prevent dam failure and protect local residents and their property, removal of the dam is often the most cost-effective response to a potentially failing dam (Stanley and Doyle 2003).

5.3 Proposed New NWP B – Living Shorelines

5.3.1 Baseline

Twenty-nine percent of the population of the United States lives in coastal counties (U.S. Census Bureau 2010). There are four broad approaches to addressing shore erosion in coastal areas: managing land use (primarily the responsibility of state and local governments) to prevent or minimize development near the shore, vegetative stabilization, shoreline hardening, and trapping or adding sand (NRC 2007). Landowners with waterfront property often want to protect their properties from erosion and those erosion protection measures and those activities usually require DA authorization. The Corps generally receives permit applications for erosion protection measures after the coastal areas have been developed and the property owner identifies an erosion problem (NRC 2007). In other words, the desire to implement erosion protection measures is a reactive response that occurs after the coastal area is

developed. The need for bank stabilization is an indirect consequence of land use planning and zoning decisions made by local and state governments, and requests for Department of the Army permits for bank stabilization activities usually come after residential, commercial, and other types of development activities occur (NRC 2007). The Corps' regulations acknowledge that waterfront property owners have the right to protect their properties from erosion (see 33 CFR 320.4(g)(2)).

In low to medium wave energy environments, living shorelines have been promoted in the past couple of years as an alternative to more traditional shore protection measures such as bulkheads, revetments, and seawalls (e.g., NOAA and USACE 2015; Popkin 2015). However, some people have cautioned that living shorelines need to be carefully designed to minimize the replacement of intertidal and subtidal habitats with fills and stone structures, and to designed to continue to allow animals to utilize shoreline habitats (e.g., Pilkey et al. 2012).

Living shorelines typically include fills planted with wetland grasses or shrubs and hard structures (e.g., sills, breakwaters) to protect the constructed fringe wetland (Gittman et al. 2016). Some living shorelines include reef structures that support oysters and other aquatic organisms (Popkin 2015, NOAA 2015). The construction and maintenance of living shorelines usually currently requires standard individual permits from the Corps because there are no NWPs that authorize these activities. Living shorelines do not usually qualify for NWP 13 authorization because they usually involve substantial amounts of fill in jurisdictional waters. NWP 27 is generally not used to authorize living shorelines because they involve the construction of stone structures not naturally occurring in coastal areas (e.g., sills, breakwaters) and are not aquatic resource restoration activities (Pilkey et al. 2012). Numerous authors have suggested that use of living shorelines to protect property from erosion would facilitated if the Corps were to issue an NWP to authorize those activities so that the time and resources required for landowners to obtain DA authorization for the construction and maintenance of living shorelines would be comparable to the time and resources required for authorization of revetments, bulkheads, and other types of bank stabilization activities authorized by NWP 13 (NRC 2007).

5.3.2 Benefits

Living shorelines can be a cost-effective erosion control approach (Popkin 2015). One of the challenges to more widespread use of living shorelines for erosion protection is the length of the permitting process, because currently most living shoreline activities require standard individual permits, if they require authorization from the Corps (NOAA and USACE 2015, Popkin 2015). This proposed new NWP would establish similar permitting processes for living shorelines (including similar amounts of time for review and approval by the Corps districts) compared to use of NWP 13 for revetments, bulkheads, vegetative stabilization, and other bank stabilization approaches. However, it should be noted that in urban areas, there might not be sufficient space to do living shorelines, and bulkheads might be the only option in those areas (NOAA and USACE 2015).

Living shorelines can have less adverse impact on intertidal habitats compared to the impacts of seawalls and bulkheads (NRC 2007). Bulkheads and seawalls reflect wave energy and cause scouring of near-shore habitats, and cause erosion of the intertidal zone and greater water depths near the bulkhead or seawall (NRC 2007). The Corps' regulations (33 CFR 320.4(r)(1)) and the 404(b)(1) Guidelines (40 CFR part 230) require project proponents to avoid and minimize losses of jurisdictional waters and wetlands. In other words, those regulations require project proponents to minimize encroachments into areas held in trust for the public (e.g., navigable waters and submerged lands). These minimization requirements can be viewed as favoring bulkheads and revetments because those erosion protection measures usually have smaller footprints in the public trust resources (NRC 2007).

All forms of erosion control, including living shorelines, cause reductions in ecosystem services compared to natural shorelines (NRC 2007). Ecosystem services provided by living shorelines include food production, nutrient removal, sediment storage, and water quality improvement (NOAA 2015), as well as recreation, natural hazard regulation, and erosion regulation (Millennium Ecosystem Asssessment 2005). However, many of those ecosystem services, especially biogeochemical cycling associated with nutrient removal and water quality improvement, may take years to develop in constructed marshes (Craft et al. 2003). Over time, living shorelines provide habitat for algae, barnacles, and oysters, and foraging areas for fish (NRC 2007, Gittman et al. 2016). Gittman et al. (2016) observed greater fish and crustacean abundance near sills that have been in place for 3 years or more, compared to bulkheads. Gittman et al. (2016) concluded that marshes with stone sills provide better near-shore habitat than vinyl bulkheads, and have habitat features analogous to reefs. Gitman et al. (2016) only examined living shoreline use by fish and crustaceans. They did not look at other ecosystem services and acknowledged that additional studies are needed to assess the provision of other ecosystem services by living shorelines.

5.3.3 Costs

There are trade-offs with living shorelines because they replace intertidal and subtidal substrate that is used by many animals with stone and fills, and may also convert areas inhabited by sea grasses to other habitat types (Popkin 2015, NRC 2007). These trade-offs can be reduced if the encroachment of living shorelines is minimized to provide a lower level of protection (NRC 2007). Living shorelines can also encroach into areas used for navigation and cause some interference with navigation (Popkin 2015). It make take a few years for living shorelines to become established and begin providing shore erosion protection, whereas bulkheads and revetments start controlling erosion when construction is completed (Popkin 2015).

Living shorelines and other forms of erosion control require periodic maintenance (NOAA and USACE 2015). Bulkheads require periodic repairs, but generally last 20 years (NRC 2007). Rock revetments that are well designed and constructed generally last up to 50 years (NRC 2007),

and some maintenance is required when storms move rock. It is more difficult to calculate the longevity of living shorelines (Popkin 2015). 7Maintenance for living shorelines is similar to landscape maintenance, especially after storm events (NOAA and USACE 2015). Maintenance activities required for living shorelines include replanting marsh vegetation, trimming tree branches to provide sunlight to marsh plants, removing debris, and repairing rock structures (e.g., sills, low-profile sand containment structures, breakwaters) (NOAA 2015). Living shorelines using vegetation and sand fills require maintenance to replace sand and marsh plants that are removed or displaced by storms; nearby banks may also need to be re-graded if they are damaged by those storm events (NRC 2007). Some proponents of living shorelines recommend monitoring of completed projects (NOAA 2015), which if required by permitting agencies, would impose additional costs to landowners.

Some landowners may prefer bulkheads and seawalls if they believe those structures provide more effective protection against erosion (Popkin 2015). Living shorelines will not be effective in all shorelines, and will require maintenance to replace marsh grasses or repair sills that are damaged during storm events (Popkin 2015). Another trade-off relates to land ownership: filling of submerged lands owned by the state to construct a living shoreline benefits the landowner, but the state may lose the submerged lands that are filled or at least some of the ecosystem functions and services provided by those submerged lands (NRC 2007).

Another cost associated with living shorelines is the cost of educating landowners and consultants on the benefits of living shorelines, because many landowners and the consultants and contractors they hire are more familiar with bulkheads and revetments, and those consultants and contractors will generally advocate using the shore protection approach they are most familiar with (NRC 2007). Landowners, consultants, and contractors may prefer bulkheads, which are expected to last 20 years, depending on the materials used, or stone revetments, which can last 50 years, depending on the quality of construction (NRC 2007).

The estimated costs of constructing and maintaining different type of shore protection measures vary widely. In Tables 5.3.1, 5.3.2, and 5.3.3, we provide summaries of studies that examined the typical costs of shore protection projects per linear foot of shore protected.

Table 5.3.1 summarizes the costs of different erosion control measures in different areas of the United States. The areas examined include Maryland, Delaware, Florida, and the northern Gulf of Mexico. The shore protection approaches covered in Table 5.3.1 include vegetative stabilization, fringe marsh with sills, off-shore breakwaters, and stone revetments.

Table 5.3.1. Cost estimates for various erosion protection approaches (CCRM 2014)

Erosion Control Technique	Cost range ($ per linear foot)
Vegetative stabilization (fill + plantings)	$45 to $225
Fringe marsh plus sill	$100 to $700
Offshore breakwaters	$125 to $1,000
Stone revetment	$115 to $1,500

Table 5.3.2 summarizes the costs of erosion protection approaches in the northern Gulf of Mexico. It includes vegetative plantings, stone revetments, off-shore breakwaters, and bulkheads. The breakwaters and bulkheads can be constructed with different materials, which affects their costs and durability.

Table 5.3.2 Cost estimates for shore protection products in the northern Gulf of Mexico (Mississippi-Alabama Sea Grant Consortium (undated).

Erosion Control Technique	Cost range ($ per linear foot)
Marsh or dune grass plantings	1.30 to 4.50
Rock revetments	120 to 180
Offshore breakwaters	
Wave attenuation devices	180 to 250
Rock breakwaters	125 to 200
Wooden sills	65 to 100
Bulkheads	
Vinyl	125 to 200
Vinyl with toe protection	210 to 285
Wooden	115 to 180
Wooden with toe protection	200 to 265

Table 5.3.3 was derived from the general cost estimates provided in the SAGE publication entitled “Natural and Structural Measures for Shoreline Stabilization” published by NOAA and the U.S. Army Corps of Engineers (2015). This table includes estimated annual operations and maintenance costs. The costs estimates provided in this publication are much higher than the cost estimates in Tables 5.3.1 and 5.3.2.

Table 5.3.3 Cost estimates for various erosion protection approaches (NOAA and USACE 2015)

Erosion Control Technique	Initial construction costs ($ per linear foot)	Annual operations and maintenance costs ($ per linear foot)
Vegetation	Up to $1,000	Up to $100
Vegetation edging	$1,001 to $2,000	$101 to $500
Sills	$1,001 to $2,000	$101 to $500
Revetment	$5,001 to $10,000	$101 to $500
Bulkhead	$2,001 to $5,000	$101 to $500
Seawall	$5,001 to $10,000	Over $500

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Appendix A – Proposed changes to existing nationwide permits, impacts of proposed new nationwide permits, and shifts between nationwide permit and standard individual permit

The following acronyms used in this table: NWP – nationwide permit; PCN – pre-construction notification; SIP – standard individual permit. ORM2 is the database maintained and used by the Corps to track various regulatory actions, including individual permits, NWP PCNs, regional general permits, and consultations conducted under Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act. ORM2 is also used to track the proposed impacts to jurisdictional waters and wetlands, the authorized impacts to jurisdictional waters and wetlands, and the amount and type of compensatory mitigation required to offset authorized losses of jurisdictional waters and wetlands.

Nationwide Permit	Proposed Changes	Estimated Annual Reported Use of 2012 NWPs (from ORM2)	Estimated Average Annual Non-Reported Activities	Estimated Changes in Number of NWP PCNs	Estimated Changes in Annual Number of NWP Authorizations	Estimated Changes in Annual Number of SIP Authorizations	Rationale
NWP 1 – Aids to navigation	None	52	200	0	0	0	No proposed changes.
NWP 2 – Structures in artificial canals	None	129	200	0	0	0	No proposed changes.
NWP 3 – Maintenance	State that NWP also authorizes removal of previously authorized structures or fills. Clarify that NWP also authorizes use of timber mats during maintenance activity.	4,275	1,000	0	-275	-25	Department of the Army permits usually have a condition requiring removal of structure or fill if it will be no longer used. Proposed change covers activities where that permit condition was not included. Temporary use of timber mats is best management practice commonly used as a fill. (Maintenance often authorized by conditions of original permit.) Propose change to NWP 13 to authorize maintenance activities estimated to result in 300 NWP 3 authorizations per year shifting to 300 NWP 13 authorizations per year.
NWP 4 – Fish and wildlife harvesting, enhancement, and attraction devices and activities	None	41	20,000	0	0	0	No proposed changes.
NWP 5 – Scientific measuring devices	None	89	100	0	0	0	No proposed changes.
NWP 6 – Survey activities	None	162	100	0	0	0	No proposed changes.

Nationwide Permit	Proposed Changes	Estimated Annual Reported Use of 2012 NWPs (from ORM2)	Estimated Average Annual Non-Reported Activities	Estimated Changes in Number of NWP PCNs	Estimated Changes in Annual Number of NWP Authorizations	Estimated Changes in Annual Number of SIP Authorizations	Rationale
NWP 7 – Outfall structures and associated intake structures	None	312	0	0	0	0	No proposed changes.
NWP 8 – Oil and gas structures on the outer continental shelf	None	8	0	0	0	0	No proposed changes.
NWP 9 – Structures in fleeting and anchorage areas	None	14	100	0	0	0	No proposed changes.
NWP 10 – Mooring buoys	None	92	5,000	0	0	0	No proposed changes.
NWP 11 – Temporary recreational structures	None	64	250	0	0	0	No proposed changes.

Nationwide Permit	Proposed Changes	Estimated Annual Reported Use of 2012 NWPs (from ORM2)	Estimated Average Annual Non-Reported Activities	Estimated Changes in Number of NWP PCNs	Estimated Changes in Annual Number of NWP Authorizations	Estimated Changes in Annual Number of SIP Authorizations	Rationale
NWP 12 – Utility line activities	Clarify that for utility lines, this NWP authorizes crossings of waters of the United States; the Corps does not regulate the construction, maintenance, or repair of utility lines per se. Add "internet" to list of examples of what might be carried by transmission lines. Modify NWP to authorize activities necessary to remediate inadvertent returns of drilling muds if frac-outs occur. Clarify that NWP also authorizes use of timber mats during temporary construction activities. Add note reminding users of definition of "single and complete linear project" and 33 CFR 330.6(b). Add note referring to requirements of 33 CFR 322.5(i) for aerial transmission lines over navigable waters. Add note clarifying that NWP authorizes maintenance activities not covered by CWA Section 404(f) exemption for maintenance.	11,447	2,500	0	0	0	Clarifying that NWP authorizes utility line crossings instead of entire utility lines is needed because litigants often assert that the Corps is regulating the construction and operation of utility lines. Many districts included permit conditions for remediation plans in case frac-outs occur during directional drilling activities; proposed change would add clarity that the NWP authorizes CWA Section 404 and RHA Section 10 activities necessary to carry out the remediation. Temporary use of timber mats is best management practice commonly used as a fill. The proposed modification of the definition of "utility line" to include lines that communicate through the internet is not expected to result in any changes to the numbers of activities authorized by NWP 12 per year, because the 2012 NWP 12 defined utility lines as being able to transmit various types of messages and communications, which could be interpreted as also including internet communications.

Nationwide Permit	Proposed Changes	Estimated Annual Reported Use of 2012 NWPs (from ORM2)	Estimated Average Annual Non-Reported Activities	Estimated Changes in Number of NWP PCNs	Estimated Changes in Annual Number of NWP Authorizations	Estimated Changes in Annual Number of SIP Authorizations	Rationale
NWP 13 – Bank stabilization	Clarify that the NWP authorizes a variety of bank stabilization techniques, including vegetative stabilization, sills, and stream barbs. State that the volume of fill discharged is to be measured along the bank, and is not limited to being placed along the bank. Add a provision requiring that the bank stabilization activity be properly maintained, and that the NWP authorizes regulated activities required for maintenance and repair. Instead of prohibiting the use of invasive species for bioengineering and vegetative stabilization, require the use of native species.	2,723	500	0	+310	-10	NWP may not have been used to authorize stream barbs, which is a bank stabilization technique that is used in some areas of the country. Proposal to add provision to authorize maintenance activities estimated to result in 300 NWP 3 authorizations per year shifting to 300 NWP 13 authorizations per year. The 2012 NWP 13 included a paragraph stating that for vegetative stabilization or bioengineering, invasive species shall not be used. The preamble to the 2012 NWP 13 explained the concept of bioengineering (see 77 FR 10198 – 10199), so the proposed changes to NWP 13 are not expected to result in any change in the use of this NWP for bioengineering and vegetative bank stabilization. No change in NWP 13 use is expected to result from requiring use of native species. The proposed modification is a more positive way of stating that invasive species should not be used.
NWP 14 – Linear transportation projects	Add note reminding users of definition of "single and complete linear project" and 33 CFR 330.6(b).	5,759	200	0	0	0	Proposed note reiterates existing regulation and the definition from the 2012 NWP, which are not changed by this proposed rule.
NWP 15 – U.S. Coast Guard approved bridges	None	19	10	0	0	0	No proposed changes.
NWP 16 – Return water from upland contained disposal areas	None	89	50	0	0	0	No proposed changes.
NWP 17 – Hydropower projects	None	4	0	0	0	0	No proposed changes.
NWP 18 – Minor discharges	None	750	200	0	0	0	No proposed changes.

Nationwide Permit	Proposed Changes	Estimated Annual Reported Use of 2012 NWPs (from ORM2)	Estimated Average Annual Non-Reported Activities	Estimated Changes in Number of NWP PCNs	Estimated Changes in Annual Number of NWP Authorizations	Estimated Changes in Annual Number of SIP Authorizations	Rationale
NWP 19 – Minor dredging	Add provision requiring dredged material to be deposited and retained in an area with no waters of the United States unless specifically approved by the Corps through a separate authorization.	150	150	0	0	0	Any placement of dredged material into waters of the United States requires a CWA Section 404 permit, so it is only a clarification, not a change in permitting practice. The 2012 NWP 19 did not authorize discharging the dredged material into waters of the United States, so there was an implicit requirement that a separate DA authorization was required.
NWP 20 – Response operations for oil or hazardous substances	Change "and" to "or" in permit title.	11	50	0	0	0	Minor change unlikely to affect the utility of this NWP.
NWP 21 – Surface coal mining activities	Remove paragraph (a) of the 2012 NWP 21. Clarify that the loss of stream bed plus any other losses of jurisdictional wetlands and waters caused by the NWP activity cannot exceed 1/2-acre.	12	0	-5	-5	+5	Increase in number of SIPs due to activities authorized by 2012 NWP 21(a) that could not complete the work under that NWP, and will require SIPs under the 2017 NWP 21. NWP 21 was reissued in 2012 with the understanding that paragraph (a) of that NWP would only be in effect for the 2012 NWP 21 (see 77 FR 10209 – 10210). Proposed clarification of how the 300 linear foot limit relates to the 1/2-acre limit will not change the number of activities authorized by this NWP.
NWP 22 – Removal of vessels	Change Note 2 to state that the emphasis on general condition 20 is because of the possibility that shipwrecks might be historic properties.	29	25	0	0	0	No change in application of general condition 20 with this NWP, because PCNs are required for all activities that might affect historic properties, so that the Corps can determine whether National Historic Preservation Act Section 106 consultation is required.
NWP 23 – Approved categorical exclusions	Change "environmental documentation" to "environmental impact statement or environmental assessment analysis".	352	300	0	0	0	Clarifying change in terminology to be more consistent with the Council on Environmental Quality's National Environmental Policy Act regulations.

Nationwide Permit	Proposed Changes	Estimated Annual Reported Use of 2012 NWPs (from ORM2)	Estimated Average Annual Non-Reported Activities	Estimated Changes in Number of NWP PCNs	Estimated Changes in Annual Number of NWP Authorizations	Estimated Changes in Annual Number of SIP Authorizations	Rationale
NWP 24 – Indian tribe or state approved section 404 programs	None.	3	10	0	0	0	No proposed changes.
NWP 25 – Structural discharges	None.	31	30	0	0	0	No proposed changes.
NWP 27 – Aquatic habitat restoration, establishment, and enhancement activities	None.	1,346	0	0	0	0	No proposed changes.
NWP 28 – Modifications of existing marinas	None.	37	40	0	0	0	No proposed changes.
NWP 29 – Residential developments	Clarify that the loss of stream bed plus any other losses of jurisdictional wetlands and waters caused by the NWP activity cannot exceed 1/2-acre.	686	0	0	0	0	Proposed clarification of how the 300 linear foot limit relates to the 1/2-acre limit will not change the number of activities authorized by this NWP.
NWP 30 – Moist soil management for wildlife	None.	2	25	0	0	0	No proposed changes.
NWP 31 – Maintenance of existing flood control facilities	None.	44	0	0	0	0	No proposed changes.
NWP 32 – Completed enforcement actions	None.	59	25	0	0	0	No proposed changes.
NWP 33 – Temporary construction, access, and dewatering	Remove requirement for PCNs for activities in CWA Section 404-only waters.	419	0	-210	0	0	Proposed change only affects requirement to submit a PCN; all other terms remain the same.
NWP 34 – Cranberry production activities	None.	0	0	0	0	0	No proposed changes.
NWP 35 – Maintenance dredging of existing basins	State that the dredged material may be deposited in waters of the United States if it is authorized by the district engineer through a separate authorization.	217	50	0	0	0	The 2012 NWP 35 did not authorize discharging the dredged material into waters of the United States, so there was an implicit requirement that a separate DA authorization was required. That separate authorization would have to be provided through another NWP, a regional general permit, or an individual permit.

Nationwide Permit	Proposed Changes	Estimated Annual Reported Use of 2012 NWPs (from ORM2)	Estimated Average Annual Non-Reported Activities	Estimated Changes in Number of NWP PCNs	Estimated Changes in Annual Number of NWP Authorizations	Estimated Changes in Annual Number of SIP Authorizations	Rationale
NWP 36 – Boat ramps	None.	280	100	0	0	0	No proposed changes.
NWP 37 – Emergency watershed protection and rehabilitation	None.	102	0	0	0	0	No proposed changes.
NWP 38 – Cleanup of hazardous and toxic waste	None.	80	0	0	0	0	No proposed changes.
NWP 39 – Commercial and institutional developments	Add wastewater treatment facilities to the list of examples of attendant features authorized by this NWP. Clarify that the loss of stream bed plus any other losses of jurisdictional wetlands and waters caused by the NWP activity cannot exceed 1/2-acre.	641	0	0	0	0	Proposed clarification will not change the number of authorized activities because the list of attendant features in the 2012 NWP 39 stated that it was not limited to those examples. Proposed clarification of how the 300 linear foot limit relates to the 1/2-acre limit will not change the number of activities authorized by this NWP.
NWP 40 – Agricultural activities	Clarify that the loss of stream bed plus any other losses of jurisdictional wetlands and waters caused by the NWP activity cannot exceed 1/2-acre.	69	0	0	0	0	Proposed clarification of how the 300 linear foot limit relates to the 1/2-acre limit will not change the number of activities authorized by this NWP.
NWP 41 – Reshaping existing drainage ditches	Remove the PCN requirements.	51	50	-51	0	0	Removal of the PCN requirements will not change number of activities authorized by this NWP.
NWP 42 – Recreational facilities	Clarify that the loss of stream bed plus any other losses of jurisdictional wetlands and waters caused by the NWP activity cannot exceed 1/2-acre.	199	0	0	0	0	Proposed clarification of how the 300 linear foot limit relates to the 1/2-acre limit will not change the number of activities authorized by this NWP.
NWP 43 – Stormwater management facilities	Change the regulation citation that states that stormwater management facilities are not waters of the United States. Clarify that the loss of stream bed plus any other losses of jurisdictional wetlands and waters caused by the NWP activity cannot exceed 1/2-acre.	177	100	0	0	0	Proposed change of regulation citation will not affect the exclusion of stormwater management facilities from the definition of waters of the United States. Proposed clarification of how the 300 linear foot limit relates to the 1/2-acre limit will not change the number of activities authorized by this NWP.

Nationwide Permit	Proposed Changes	Estimated Annual Reported Use of 2012 NWPs (from ORM2)	Estimated Average Annual Non-Reported Activities	Estimated Changes in Number of NWP PCNs	Estimated Changes in Annual Number of NWP Authorizations	Estimated Changes in Annual Number of SIP Authorizations	Rationale
NWP 44 – Mining activities	Clarification of calculation of the 1/2-acre limit, and how the 300 linear foot limit for losses of stream bed fits with the 1/2-acre limit.	34	0	0	0	0	Proposed clarification of how the 300 linear foot limit relates to the 1/2-acre limit will not change the number of activities authorized by this NWP.
NWP 45 – Repair of uplands damaged by discrete events	Allow district engineers to waive the 12-month limit for submitting a PCN if the permittee can demonstrate funding, contract, or other similar delays after a major storm, flood, or other discrete event.	101	0	+25	+25	-25	Authority to grant exceptions to the two year notification period allows greater flexibility to authorize these activities by NWP
NWP 46 – Discharges in ditches	None	43	0	0	0	0	No proposed changes.
NWP 48 – Commercial shellfish aquaculture activities	Require reporting for activities authorized by 2012 NWP 48 that required PCNs, instead of PCNs	327	50	-50	0	0	Removal of PCN requirement for dredged harvesting, tilling, or harrowing in areas inhabited by submerged aquatic vegetation likely to result in a small change in the average annual number of PCNs submitted each year because of the PCN requirement in GC 18 for activities that might affect ESA listed species or critical habitat.
NWP 49 – Coal remining activities	None	12	0	0	0	0	No proposed changes.
NWP 50 – Underground coal mining activities	Clarify that the loss of stream bed plus any other losses of jurisdictional wetlands and waters caused by the NWP activity cannot exceed 1/2-acre.	6	0	0	0	0	Proposed clarification of how the 300 linear foot limit relates to the 1/2-acre limit will not change the number of activities authorized by this NWP.
NWP 51 – Land-based renewable energy generation facilities	Clarify that the loss of stream bed plus any other losses of jurisdictional wetlands and waters caused by the NWP activity cannot exceed 1/2-acre.	5	0	0	0	0	Proposed clarification of how the 300 linear foot limit relates to the 1/2-acre limit will not change the number of activities authorized by this NWP.

Nationwide Permit	Proposed Changes	Estimated Annual Reported Use of 2012 NWPs (from ORM2)	Estimated Average Annual Non-Reported Activities	Estimated Changes in Number of NWP PCNs	Estimated Changes in Annual Number of NWP Authorizations	Estimated Changes in Annual Number of SIP Authorizations	Rationale
NWP 52 – Water-based renewable energy generation pilot projects	Remove the limitation to pilot projects and the requirement to obtain separate Department of the Army authorization if the project proponent wants the project permanently authorized. Clarify that hydrokinetic renewable energy generation projects that require authorization by the Federal Energy Regulatory Commission under the Federal Power Act of 1920 do not require separate authorization from the Corps under Section 10 of the Rivers and Harbors Act of 1899. Clarify that the loss of stream bed plus any other losses of jurisdictional wetlands and waters caused by the NWP activity cannot exceed 1/2-acre. Add floating solar panels in Rivers and Harbors Act of 1899 Section 10 waters.	1	0	+1	+1	-1	Small number of units authorized by this NWP not expected to result in substantial increases in authorized activities. Clarification that hydrokinetic generation projects in navigable waters authorized by the Federal Energy Regulatory Commission do not require separate Department of the Army authorization not expected to result in changes in the annual number of NWP 52 activities. Proposed clarification of how the 300 linear foot limit relates to the 1/2-acre limit will not change the number of activities authorized by this NWP. Floating solar panels are relatively new, so it is expected that there will be few requests for NWP authorization.
NWP A – Removal of low-head dams	New NWP	No prior NWP authorization	0	+25	+25	-25	Activities previously required standard individual permits, if regional general permits were not available.
NWP B – Living shorelines	New NWP	No prior NWP authorization	0	+200	+200	-200	Activities previously required standard individual permits, if regional general permits were not available.
GC 1 – Navigation	None.	n/a	n/a	0	0	0	No proposed changes.
GC 2 – Aquatic live movements	None.	n/a	n/a	0	0	0	No proposed changes.
GC 3 – Spawning areas	None.	n/a	n/a	0	0	0	No proposed changes.
GC 4 – Migratory bird breeding areas	None.	n/a	n/a	0	0	0	No proposed changes.
GC 5 – Shellfish beds	None.	n/a	n/a	0	0	0	No proposed changes.
GC 6 – Suitable material	None.	n/a	n/a	0	0	0	No proposed changes.

Nationwide Permit	Proposed Changes	Estimated Annual Reported Use of 2012 NWPs (from ORM2)	Estimated Average Annual Non-Reported Activities	Estimated Changes in Number of NWP PCNs	Estimated Changes in Annual Number of NWP Authorizations	Estimated Changes in Annual Number of SIP Authorizations	Rationale
GC 7 – Water supply intakes	None.	n/a	n/a	0	0	0	No proposed changes.
GC 8 – Adverse effects from impoundments	None.	n/a	n/a	0	0	0	No proposed changes.
GC 9 – Management of water flows	None.	n/a	n/a	0	0	0	No proposed changes.
GC 10 – Fills within 100-year floodplains	None.	n/a	n/a	0	0	0	No proposed changes.
GC 11 – Equipment	None.	n/a	n/a	0	0	0	No proposed changes.
GC 12 – Soil erosion and sediment control	None.	n/a	n/a	0	0	0	No proposed changes.
GC 13 – Removal of temporary fills	None.	n/a	n/a	0	0	0	No proposed changes.
GC 14 – Proper maintenance	None.	n/a	n/a	0	0	0	No proposed changes.
GC 15 – Single and complete project	None.	n/a	n/a	0	0	0	No proposed changes.
GC 16 – Wild and scenic rivers	Add PCN requirement for proposed NWP activities in Wild and Scenic Rivers or "study rivers" covered under the Wild and Scenic River Act.	n/a	n/a	5	0	0	Current general condition was unclear as to the Corps' responsibility to coordinate with the appropriate Federal agency with direct management responsibility for covered rivers, to obtain the required written determinations.
GC 17 – Tribal rights	None.	n/a	n/a	0	0	0	No proposed changes.
GC 18 – Endangered species	Add definitions of "direct effect" and "indirect effects." Revise paragraph (b) to state that the district engineer will verify that the appropriate ESA Section 7 consultation document has been submitted and that if additional section 7 consultation is required, then the Federal permittee is responsible for conducting that additional consultation.	n/a	n/a	0	0	0	No provision in the NWPs or the NWP regulations states that federal permittees must submit PCNs to comply with GC 18. They only have to submit their section 7 compliance documentation if other terms and conditions (including regional conditions) require submittal of a PCN. The proposed change is only a clarification to address numerous questions that were asked during implementation of the 2012 NWPs.

Nationwide Permit	Proposed Changes	Estimated Annual Reported Use of 2012 NWPs (from ORM2)	Estimated Average Annual Non-Reported Activities	Estimated Changes in Number of NWP PCNs	Estimated Changes in Annual Number of NWP Authorizations	Estimated Changes in Annual Number of SIP Authorizations	Rationale
GC 19 – Migratory bird and bald and golden eagle permits	State that the permittee is responsible for complying with the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act.	n/a	n/a	0	0	0	The permittee should contact the U.S. Fish and Wildlife Service regarding their obligations under these Acts. The U.S. Fish and Wildlife Service can use its enforcement authorities where unauthorized take of eagle or migratory birds occurs.
GC 20 – Historic properties	Revise paragraph (b) to state that the district engineer will verify that the appropriate NHPA Section 106 consultation document has been submitted and that if additional section 106 consultation is required, then the Federal permittee is responsible for conducting that additional consultation.	n/a	n/a	0	0	0	No provision in the NWPs or the NWP regulations states that federal permittees must submit PCNs to comply with GC 20. They only have to submit their section 7 compliance documentation if other terms and conditions (including regional conditions) require submittal of a PCN. The proposed change is only a clarification to address numerous questions that were asked during implementation of the 2012 NWPs.
GC 21 – Discovery of previously unknown remains and artifacts	None.	n/a	n/a	0	0	0	No proposed changes.
GC 22 – Designated critical resource waters	Add NWP B to the list of NWPs that require PCNs so that district engineers can evaluate effects to designated critical resource waters.	n/a	n/a	0	0	0	All proposed NWP B activities will require PCNs.
GC 23 – Mitigation	State that mitigation bank and in-lieu fee program credits are the preferred means of fulfilling compensatory mitigation requirements imposed by district engineers.	n/a	n/a	0	0	0	District engineers retain the discretion to require compensatory mitigation through mitigation bank credits, in-lieu fee program credits, and permittee-responsible mitigation. Mitigation bank credits and in-lieu fee program credits are more effective and efficient for the small impacts authorized by the NWPs.
GC 24 – Safety of impoundment structures	None.	n/a	n/a	0	0	0	No proposed changes.
GC 25 – Water quality	None.	n/a	n/a	0	0	0	No proposed changes.

Nationwide Permit	Proposed Changes	Estimated Annual Reported Use of 2012 NWPs (from ORM2)	Estimated Average Annual Non-Reported Activities	Estimated Changes in Number of NWP PCNs	Estimated Changes in Annual Number of NWP Authorizations	Estimated Changes in Annual Number of SIP Authorizations	Rationale
GC 26 – Coastal zone management	None.	n/a	n/a	0	0	0	No proposed changes.
GC 27 – Regional and case-specific conditions	None.	n/a	n/a	0	0	0	No proposed changes.
GC 28 – Use of multiple nationwide permits	None.	n/a	n/a	0	0	0	No proposed changes.
GC 29 – Transfer of nationwide permit verifications	None.	n/a	n/a	0	0	0	No proposed changes.
GC 30 – Compliance certification	Add provision stating that the completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation.	n/a	n/a	0	0	0	Requirement does not affect the numbers of activities authorized by NWP because this compliance certification requirement only applies to NWP activities.
GC 31 – . Activities Affecting Structures or Works Built by the United States	New general condition.	n/a	n/a	0	0	0	Item 5 of "Further information" section of the 2012 NWPs stated that the NWPs do not authorize activities that interfere with any existing or proposed Federal project, so activities could not be authorized by NWP until the Corps issues a Section 408 permission. The new general condition will not change the number of activities authorized by NWP.

Nationwide Permit	Proposed Changes	Estimated Annual Reported Use of 2012 NWPs (from ORM2)	Estimated Average Annual Non-Reported Activities	Estimated Changes in Number of NWP PCNs	Estimated Changes in Annual Number of NWP Authorizations	Estimated Changes in Annual Number of SIP Authorizations	Rationale
GC 32 – Pre-construction notification	Require PCN to identify the specific NWP(s) the project proponent wants to use. Require PCN to describe proposed mitigation measures to ensure no more than minimal adverse environmental effects. For single and complete linear projects, require the PCN to state the quantity of proposed losses of waters of the United States at each single and complete crossing of waters of the United States. If the proposed activity will occur in a Wild and Scenic River or a designated study river, the PCN must identify the river. If the proposed NWP activity also requires section 408 permission from the Corps, the PCN must include a statement confirming that the project proponent has applied for that section 408 permission. Require agency coordination for proposed NWP B activities seeking a waiver of one or more of its limits.	n/a	n/a	0	0	0	Proposed changes will not alter the number of activities authorized by NWPs, but will provide better information that should reduce the processing times for PCNs.
Totals				-60	281	-281	

Appendix B – Comparison of estimated annual mean use of the 2012 nationwide permits and projected mean annual use of proposed 2017 nationwide permits.

Using data on NWP use from March 19, 2012, to March 12, 2015, the Corps estimated the mean annual use of the draft proposed NWPs, with estimates of the impacted acreage (including both permanent and temporary impacts) and acreage of required compensatory mitigation. Impacted acreages include both permanent and temporary impacts in waters of the United States, including navigable waters. The Corps points out that not all permanent impacts (e.g., conversions of one wetland type to another wetland type) result in permanent losses of jurisdictional wetlands and waters.

NWP Number	2012 NWPs			Projected Changes in Mean Annual Use for Draft Proposed 2017 NWPs	Proposed 2017 NWPs		
	Estimated Mean Annual Activities Authorized	Estimated Mean Annual Acreage Impacted	Mean Annual Acreage of Comp. Mitigation		Projected Mean Annual Activities Authorized	Projected Mean Annual Acreage Impacted	Projected Mean Annual Acreage of Comp. Mitigation
1	252	0.533	0	0	252	0.533	0
2	329	3.827	0.04	0	329	3.827	0.040
3	5,275	563.179	48.765	-275	5,000	559.054	48.765
4	20,041	202.959	0.184	0	20,041	202.959	0.184
5	189	4.691	0.003	0	189	4.691	0.003
6	262	31.124	0.003	0	262	31.124	0.003
7	312	17.146	1.655	0	312	17.146	1.655
8	8	571.403	0	0	8	571.403	0
9	114	3.833	0	0	114	3.833	0
10	5,092	5.327	0.013	0	5,092	5.327	0.013
11	314	3.227	0	0	314	3.227	0
12	13,947	1,773.714	296.208	0	13,947	1,773.714	296.208
13	3,223	73.158	20.889	+310	3,533	77.498	20.889
14	5,959	359.919	266.161	0	5,959	359.919	266.161
15	29	4.918	5.3	0	29	4.918	5.300
16	139	10.09	0.269	0	139	10.090	0.269
17	4	2.847	2.617	0	4	2.847	2.617
18	950	31.235	29.178	0	950	31.235	29.178
19	300	3.121	0.13	0	300	3.121	0.130
20	61	11.311	0.367	0	61	11.311	0.367
21	12	29.842	39.431	-5	7	1.263	1.644
22	54	5.464	0	0	54	5.464	0
23	652	255.962	242.608	0	652	255.962	242.608
24	13	0.755	0	0	13	0.755	0
25	61	2.068	0.498	0	61	2.068	0.498

NWP Number	2012 NWPs			Projected Changes in Mean Annual Use for Draft Proposed 2017 NWPs	Proposed 2017 NWPs		
	Estimated Mean Annual Activities Authorized	Estimated Mean Annual Acreage Impacted	Mean Annual Acreage of Comp. Mitigation		Projected Mean Annual Activities Authorized	Projected Mean Annual Acreage Impacted	Projected Mean Annual Acreage of Comp. Mitigation
26	-	-	-	-	-	-	-
27	1346	3,490.525	297.275	0	1,346	3,490.525	297.275
28	77	7.850	0.073	0	77	7.850	0.073
29	686	93.886	454.392	0	686	93.886	454.392
30	27	187.254	0	0	27	187.254	0
31	44	99.169	1.525	0	44	99.169	1.525
32	84	92.226	120.475	0	84	92.226	120.475
33	419	109.945	14.89	0	419	109.945	14.89
34	0	0	0	0	0	0	0
35	267	350.659	0.167	0	267	350.659	0.167
36	380	7.585	3.973	0	380	7.585	3.973
37	102	29.601	24.513	0	102	29.601	24.513
38	80	144.257	26.384	0	80	144.257	26.384
39	641	111.310	375.397	0	641	111.310	375.397
40	69	11.572	7.197	0	69	11.572	7.197
41	101	26.955	1.12	0	101	39.519	1.12
42	199	23.984	21.92	0	199	23.984	21.92
43	277	78.947	26.931	0	277	78.947	26.931
44	34	4.237	35.664	0	34	4.237	35.664
45	101	16.171	0.347	+25	126	20.174	0.347
46	43	12.468	2.816	0	43	12.468	2.816
47	-	-	-	-	-	-	-
48	377	11,366.689	0.037	0	377	11,366.689	0.037
49	12	54.520	38.022	0	12	54.520	38.022
50	6	0.689	0.688	0	6	0.689	0.688
51	5	2.746	1.98	0	5	2.746	1.98
52	1	0.413	0	+1	2	0.826	0
A	N/A	N/A	N/A	+25	25	0.886	0
B	N/A	N/A	N/A	+200	200	27.548	0
Total	**62,970**	**20,295.311**	**2,410.105**	**+281**	**63,251**	**20,312.360**	**2,372.318**
Totals excluding NWPs 27 and 48*	**61,247**	**5,438.097**	**2,112.793**	**+281**	**61,528**	**5,455.146**	**2,075.006**

* Aquatic resource restoration activities authorized by NWP 27 must result in net increases in aquatic resource functions and services, and the commercial shellfish aquaculture activities authorized by NWP 48 cannot not result in losses of jurisdictional waters or waters. The activities authorized by NWP 48 usually have positive or neutral effects on aquatic resource functions and services because they increase the numbers of filter feeding molluscs in waterbodies, which helps improve water quality.