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Section 404 and Wetland Alterations in the Platte River Basin of Colorado



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Section 404 and Wetland Alterations in the Platte River Basin of Colorado

by

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Abstract. A study of Section 404 permitting activities in the Platte River Basin of Colorado was conducted for the period 1985–89. Agency files were examined to determine the magnitude of wetland alterations authorized under Nationwide Permit 26 (NWP 26; <1 acre), NWP 26 (1–10 acres), and Individual Permits; the types of wetlands in which these alterations occurred; the types of projects involved in these alterations; and the amount of replacement habitat requested through mitigation in the form of wetland restoration or creation. Alterations permitted under Section 404 were stated in terms of area or volume. Those stated in terms of area accounted for 415 acres; most of these occurred in palustrine wetlands, which have high value to wildlife. Alterations stated in terms of volume accounted for discharge of an additional 202,000 cubic yards of material, mostly in riverine wetlands. Many different types of projects were authorized under both NWP 26 and Individual Permits. Mitigation was recommended most often for Individual Permits, less commonly for NWP 26 (1–10 acres), and rarely for NWP 26 (<1 acre). Projects authorized under NWP 26 did not seem to meet certain regulatory requirements, for example, that they be similar in nature and have minimal individual and cumulative effects.

Key words: Section 404, Clean Water Act, wetland losses, wetlands, wetland alterations, wetland effects, mitigation.

Section 404 of the Clean Water Act of 1977 is the principal federal authority for regulation of wetland alterations. Section 404 requires those wishing to discharge dredged or fill material into waters of the United States, which include many wetlands, to obtain a federal permit. The Environmental Protection Agency (EPA) has oversight responsibility for the program and has promulgated guidelines, known as the Section 404(b)(1) Guidelines, for issuing permits—40 Code of Federal Regulations (CFR) 230. The U.S. Army Corps of Engineers (Corps) administers the program and issues Section 404 permits after review and comment (in most instances) by EPA, the U.S. Fish and Wildlife Service (Service), the National Marine Fisheries Service, and state natural resource

agencies. Other state and federal agencies and the public also have the opportunity to comment.

Section 404 permits can be of two types. Individual Permits are issued after case-by-case review of Public Notices regarding proposed discharges. General Permits, which can be either regional or nationwide in scope, are authorized by the Corps for categories of activities judged to be similar in nature and having only minimal individual and cumulative adverse environmental effects (40 CFR 230.7). The Corps presently authorizes Nationwide Permits for 26 categories of activities.¹ Of these, Nationwide Permit 26 (NWP 26) is perhaps of greatest concern to natural resource agencies because it authorizes discharges of a certain maximum size with minimal or no require-

¹ As this manuscript was being prepared, the Corps proposed modifying the existing Nationwide Permits and issuing 13 new ones (Federal Register 56(69): 14598-14618).

ment that the regulatory or resource agencies be notified, and because it is nonspecific regarding the types of activities authorized.

Nationwide Permit 26 provides for situations in which a discharge of dredged or fill material will affect <10 acres of nontidal wetlands that are either isolated (i.e., not part of a surface tributary system to interstate waters or navigable waters of the United States) or above the headwaters (i.e., adjacent to a stream with <5 cubic feet per second [cfs] average annual flow). If the discharge will affect <1 acre, the project proponent is not required to notify the regulatory or natural resource agencies, and there is no opportunity to review the activity for compliance with the Section 404(b)(1) Guidelines or to propose mitigation. Consequently, little information exists on how often or where discharges affecting <1 acre occur. If the discharge will affect between 1 and 10 acres, the proponent is required to notify the Corps of the intended action. The Corps then issues a PredischARGE Notification (PDN) to regulatory and resource agencies if the discharge would occur in a category of waters previously identified as being of interest to these agencies, or in a category of waters likely to be of interest—33 CFR 330.7(c)(1)(i). Regulations require the Corps to respond to the project proponent within 20 days of being notified. If the Corps fails to respond within 20 days, the proposed activity may proceed—33 CFR 330.7(a). Although commenting agencies sometimes propose mitigation in regard to PDN's, they more often request that an Individual Permit be required if the resources involved are judged to be significant. If the Corps requires an Individual Permit, agencies have more time to review the application and propose mitigation because Individual Permits are not subject to the 20-day limit.

In cases where individual or regional conditions on Nationwide Permits may be insufficient to address concerns for the aquatic environment, or where there is not sufficient time to develop such conditions, the Corps may suspend use of a Nationwide Permit and require Individual Permit applications on a case-by-case basis—33 CFR 330.8(c). Individual Permits are also required for discharges of any size that occur in tidal wetlands or wetlands adjacent to a watercourse with >5 cfs average annual flow, and for discharges that affect >10 acres of wetlands that are above the headwaters or are isolated. When a project proponent submits an application for an Individual Permit, the Corps issues a Public Notice describing the proposed activity. Regulatory and resource agencies and the public have the opportunity to comment, often proposing specific mitigation or modifications to

project design or timing, and occasionally recommending denial.

Substantial information is available concerning wetland losses for the United States as a whole (Frayer et al. 1983) and for some smaller geographic areas (Tiner 1984); however, relatively little information exists on how these losses relate to Section 404. Nationwide Permit 26, in particular, has recently been a topic of considerable discussion (Goldman-Carter 1989; Goode 1989). Most of this discussion, however, has focused on legal and institutional issues, such as whether NWP 26 meets the criterion that Nationwide Permits be for categories of activities that are substantially similar in nature, and whether the Corps' workload would increase significantly if NWP 26 were abolished. There seems to be little information available on the magnitude of wetland alterations permitted under NWP 26, and because alterations <1 acre need not be reported to the Corps, the information that is available (Laney 1988; Goldman-Carter 1989) pertains to alterations between 1 and 10 acres.

Project proponents sometimes contact the Corps regarding discharges that affect <1 acre; since October 1984 the Corps' Tri-Lakes Project Office in Littleton, Colorado (Omaha District), has maintained a record of these contacts. Although an unknown fraction of the discharges affecting <1 acre were reported, these data allowed us to obtain at least a minimum estimate of wetland alterations permitted under NWP 26, as well as to compare these alterations with those authorized under Individual Permits. For the period 1985 through 1989, in the area administered from the Tri-Lakes Project Office of the Corps (the South Platte River drainage in Colorado), our objectives were to determine the magnitude of wetland alterations authorized under NWP 26 (<1 acre), NWP 26 (1–10 acres), and Individual Permits; the types of wetlands in which these alterations occurred; the types of projects involved in these alterations; and the amount of replacement habitat obtained through mitigation in the form of wetland restoration or creation.

Study Area

For matters relating to Section 404, the Tri-Lakes Project Office administers the area in northeastern Colorado bounded by the State border on the east and north, the Continental Divide on the west, and the divide between the drainages of the South Platte and Arkansas rivers on the south (Fig. 1). During 1985–89, most of the 404 activity in this area occurred

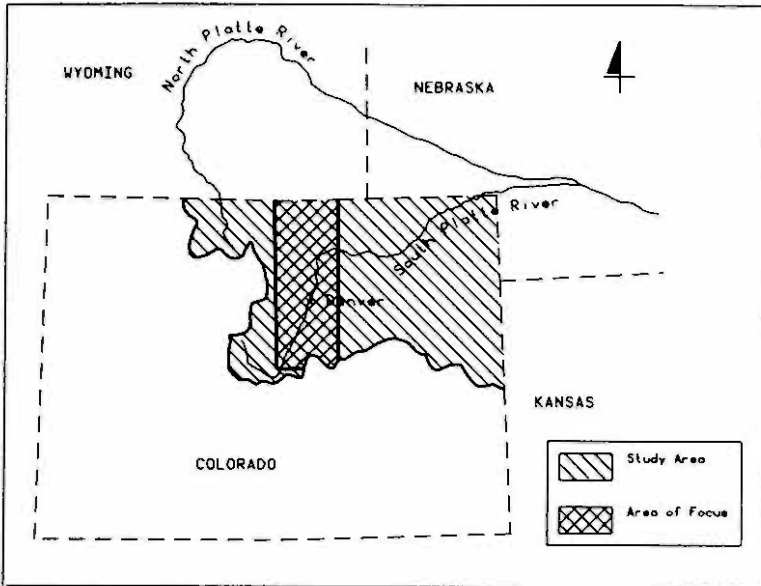


Fig. 1 Study area and area of focus for site investigations.

in a corridor along the front range of the Rocky Mountains, roughly defined by $105^{\circ}30'$ on the west, $104^{\circ}30'$ on the east, 41° on the north, and 39° on the south. We focused on this area for site investigations.

Procedures

We obtained the basic information for this study from files in offices of the Corps (Littleton), EPA (Denver), the Service (Golden), and the Colorado Division of Wildlife (Fort Collins). For each wetland alteration provided for under NWP 26 or Individual Permit that occurred from 1985 through 1989, we recorded the magnitude, location, type of project, and any recommended mitigation in the form of wetland restoration or creation. When available, information on the magnitude of the alterations was recorded in terms of both wetland area and volume of dredged or fill material discharged.

We identified the wetland types affected by the alterations by cross-referencing the project locations to maps produced by the National Wetlands Inventory (NWI), St. Petersburg, Florida, according to the classification of Cowardin et al. (1979). Wetland type was recorded as unknown if the information in the file was inadequate for locating the project on the NWI map, or if the NWI map did not indicate a wetland at the project location.

We then visited a substantial subset of the project sites. We did not visit sites where the wetland type was unknown, sites where the magnitude of the discharge was stated only in terms of volume, or sites outside the area of focus. During these site visits, we compared the actual size of the alteration to that stated in the files, and we determined the status of any

mitigation associated with the project. We did not make detailed measurements of the alteration. We simply estimated whether there were gross differences between what was authorized and what actually happened.

Results

Magnitude of Effects

From 1985 through 1989, at least 402 projects were authorized under NWP 26 and Individual Permits in the area administered from the Tri-Lakes Project Office of the Corps (Table 1). Detailed information on each of these projects is found in the Appendix. About 67% (269) of the known projects were authorized under NWP 26. The number of projects authorized each year under NWP 26 (<1 acre) seems to have increased during the period, but this may be the result of an increasing number being reported to the Corps. The number of projects <1 acre not reported to the Corps

Table 1. *Number of projects authorized.*

Year	NWP ^a 26	NWP 26	Individual Permits
	<1 acre	1-10 acres	
1985	15	4	19
1986	46	6	37
1987	54	3	28
1988	63	4	31
1989	71	3	18
Total	249	20	133

^a Nationwide Permit.

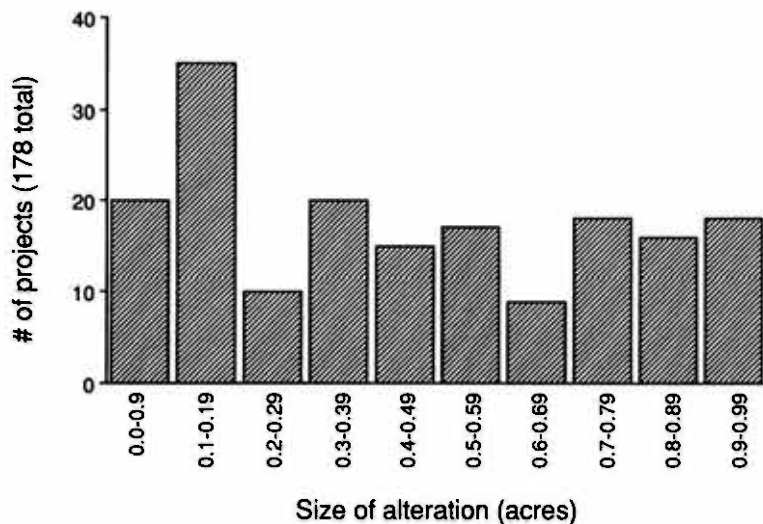


Fig. 2. Number of Nationwide Permit 26 (<1 acre) projects by size class.

is unknown. Figure 2 illustrates that the reported projects were fairly evenly distributed across 0.1-acre size classes.

Table 2 shows the magnitude of the wetland alterations associated with 391 of the 402 authorized projects, as determined from agency files. Slightly less than 415 wetland acres were altered by 315 of these projects, and more than 202,000 cubic yards of dredged or fill material were discharged in another 76 projects for which the area of the alteration was not stated and could not be estimated with certainty. Of the alterations for which the area could be deter-

mined, about 42% (172.5 acres) were authorized under NWP 26.

We believe that the information obtained from agency files and presented in Table 2 is reasonably accurate because our site visits identified only a few cases where the actual magnitude of the alteration appeared to be significantly different from that indicated in the files. We attempted to visit 164 of the project sites (Table 3) to compare file information with actual alterations. For 39 of the projects (shown as Unknown in Table 3), it was impossible to estimate the actual area of the alteration. Of the remain-

Table 2. Magnitude of permitted wetland alterations as indicated in agency files. Areas are in acres and volumes are in cubic yards. Parenthetical entries are numbers of projects for which the magnitude of the alteration could be determined.

Year	Area			Volume
	NWP ^a 26 <1 acre ^b	NWP 26 1-10 acres	Individual Permits ^c	Individual Permits ^c
1985	6.49 (15)	15.41 (4)	18.67 (4)	32,885 (14)
1986	22.48 (46)	12.46 (6)	102.38 (16)	27,295 (15)
1987	24.43 (54)	13.37 (3)	23.32 (4)	41,251 (22)
1988	30.04 (63)	14.05 (4)	57.61 (12)	87,242 (17)
1989	25.87 (71)	7.90 (3)	40.40 (10)	13,795 (8)
Total	109.31 (249)	63.19 (20)	242.38 (46)	202,468 (76)

^a Nationwide Permit.

^b Size of the alteration was stated specifically in only 178 cases; the remainder were stated only to be <1 acre. The average alteration for the 178 cases was 0.44 acres. The remaining 71 alterations were assumed to be 0.44 acres each.

^c Of the 133 Individual Permits examined, 46 stated the area to be altered, 76 stated only the volume of the discharge and 11 did not state the magnitude of the alteration in terms of either area or volume.

Table 3. *Comparison of wetland alterations indicated in permit files with results of site visits. Table entries are numbers of projects with percentages in parentheses.*

Alteration	NWP ^a 26 <1 acre	NWP 26 1-10 acres	Individual Permits
Not yet initiated	15 (13)	1 (6)	4 (12)
Same size as indicated in permit	53 (47)	11 (65)	12 (35)
As much as 1 acre larger than indicated in permit	11 (10)	1 (6)	3 (9)
More than 1 acre larger than indicated in permit	3 (3)	—	—
As much as 1 acre smaller than indicated in permit	5 (4)	3 (18)	3 (9)
Size unknown ^b	26 (23)	1 (6)	12 (35)
Total	113	17	34

^a Nationwide Permit.

^b The size of some alterations was impossible to estimate because the sites could not be accessed, the projects were still active, the fill was temporary in nature, or the previous disturbance was no longer detectable.

der, it appeared that the actual alteration might be as much as an acre larger than was stated in the files in 15 cases, more than an acre larger in 3 cases, and as much as an acre smaller in 11 cases.

Wetland Types Altered

We were not able to determine the type of wetland affected by a project for a substantial number of cases (Table 4). When we could determine the wetland type, and the magnitude of the alteration was stated in terms of area, wetlands in the palustrine system as defined by Cowardin et al. (1979) were most affected.

When the magnitude of the alteration was stated only in terms of volume, wetlands of the riverine system were most affected. These projects largely involved channelization and bank stabilization. Additional detail on the types of wetlands altered (i.e., to the class level of Cowardin et al., 1979, with modifiers) can be found in the Appendix.

Project Types

Wetland alterations involved many different types of projects (see Appendix), which are summarized into major classes in Table 5. In many cases involv-

Table 4. *Magnitude of alterations by wetland system as determined from National Wetlands Inventory maps. Areas are in acres and volumes are in cubic yards.*

Wetland system	Area			Volume
	NWP ^a 26 <1 acre	NWP 26 1-10 acres	Individual Permits	Individual Permits
Palustrine	45.42	46.69	133.05	64,698
Riverine	13.06	10.05	63.53	116,287
Lacustrine	3.99	—	1.3	18,183
Unknown	46.84	6.45	44.50	3,300
Total	109.31	63.19	242.38	202,468

^a Nationwide Permit.

Table 5. *Magnitude of alterations for various types of projects. Areas are in acres and volumes are in cubic yards. Parenthetical entries are numbers of projects.*

Project type	Area			Volume
	NWP ^a 26 <1 acre	NWP 26 1–10 acres	Individual Permits	Individual Permits
Unknown	26.28 (54)	32.35 (8)	0.71 (2)	
Channel or bank modification	28.36 (68)	4.22 (2)	54.27 (9)	128,006 (37)
Drainage improvement or flood control	9.79 (27)		14.1 (2)	15,052 (20)
Road development or widening	7.63 (22)	15.07 (4)	20.85 (5)	15,000 (1)
Bridge construction or replacement	5.85 (15)	1.25 (1)	3.25 (9)	34,690 (17)
Dam construction or improvement	7.63 (14)		1.45 (1)	4,534 (3)
Housing development	7.07 (13)	4.70 (2)	31.00 (3)	
Recreation development or improvement	5.31 (12)	3.20 (2)	16.75 (4)	2,533 (3)
Pond construction or improvement	4.51 (10)		33.50 (5)	150 (1)
Miscellaneous	4.92 (9)	2.40 (1)	23.39 (4)	1,503 (4)
Mining	1.96 (5)		43.11 (2)	1,000 (1)
Total	109.31 (249)	63.19 (20)	242.38 (46)	202,468 (87)

^a Nationwide Permit.

ing NWP 26, the type of project was not clearly stated, at least not in the information in the files. These projects are listed as "Unknown" in Table 5. Across all permit types, channel and streambank modifications accounted for about 21% of the total wetland area altered and 63% of the additional volume of dredged or fill material. Many of the alterations shown for "Miscellaneous" in Table 5 resulted from construction of commercial facilities (e.g., an airport, a trailer wash, parking lots, shopping centers, a restaurant).

Mitigation

Mitigation, in the form of wetland restoration or creation, offered or required in connection with the permits we examined is summarized in Table 6. Only two project proponents offered wetland creation in connection with NWP 26 (<1 acre), for a total of 0.51 acres. If we subtract from this figure the total area altered (109.31 acres; Table 1), the net alteration for NWP 26 (<1 acre) was -108.80 acres. Wetland restoration or creation to offset damages was offered or required in 50% (10 of 20) of the cases involving NWP 26 (1–10 acres). The net alteration for these permits was -23.69 acres.

Project proponents agreed to restore or create more than 381 acres of wetlands as mitigation for activities authorized by 42 (32%) of the 133 Individual Permits examined. We could not calculate a net alter-

ation for these Individual Permits, however, because the total area altered is unknown. Some Individual Permits described the alteration only in terms of the volume of the discharge, yet they quantified associated mitigation in terms of area. Given the magnitude of this additional volume (over 202,000 cubic yards), it seems likely that the net alteration resulting from Individual Permits was also negative. Furthermore, the Individual Permits included two cases in which creation of 157.5 acres of ponds and marsh was part of the basic project purpose (to provide waterfowl habitat and hunting opportunity), but was also counted as mitigation. If the area created in these

Table 6. *Wetland restoration and creation offered or required as mitigation. Table entries are in acres with numbers of projects in parentheses.*

Mitigation type	NWP ^a 26 <1 acre	NWP 26 1–10 acres	Individual Permits
Creation	0.51 (2)	32.1 (7)	372.76 (36)
Restoration		7.4 (4)	8.51 (7)
Total	0.51 (2)	39.5 (10)^b	381.27 (42)^b

^a Nationwide Permit.

^b One NWP 26 (1–10 acres) and one Individual Permit involved both creation and restoration, so the total number of projects is less than the sum of the number involving creation and the number involving restoration.

two projects is excluded, mitigation for Individual Permits is much closer to the total alteration that could be quantified in terms of area (Table 2).

During site visits, we attempted to obtain information on the current status of these mitigation efforts. Unfortunately, many of the mitigation projects were not yet started and many others were not accessible. Therefore, we do not know how much of the offered or required mitigation has been or will be carried out. However, Corps personnel from the Tri-Lakes Office indicated that they will make a conscientious effort to ensure that mitigation is successfully completed.

Discussion

We have purposely described the results of this study as "wetland alterations" and have avoided the term "wetland losses." Many of the wetlands affected by projects that we reviewed have been completely destroyed, but others undoubtedly retain at least some of their original functions and values. We suspect, however, that few of the altered wetlands were unaffected in their value as fish and wildlife habitat.

Similarly, we have avoided use of the word "impact" because of its importance in the regulatory description of NWP 26. If other requirements are met, activities can be authorized under NWP 26 when they affect <10 acres of waters of the United States, including wetlands. A common criticism is that activities proposed for authorization under NWP 26 are usually evaluated by their "footprint" (i.e., the area directly affected) rather than their total area of effect. For example, effects on water quality may extend well beyond the area directly disturbed by a project. Obviously, the footprint of a project is much easier to determine than the total area affected, especially since some off-site effects may take months or years to become apparent. During site visits, we essentially attempted to assess whether the footprint of the project was as described in the file information. We noted, however, a few instances in which it appeared that the project was having significant off-site effects (e.g., through drainage of an area larger than that affected by the discharge).

Information obtained in this study is also relevant to several other concerns that natural resource agencies have regarding Section 404 permits in general and NWP 26 in particular. One such concern is the lack of opportunity to comment on projects affecting <1 acre. Potential effects on threatened or endan-

gered species cannot be evaluated, and mitigation for other effects cannot be requested. Our data clearly show that mitigation in the form of wetland restoration or creation was nearly nonexistent for NWP 26 (<1 acre). The two cases in which mitigation occurred involved project proponents who independently solicited input from regulatory and resource agencies.

Also regarding mitigation, there is the more general question of whether wetlands that are restored or created adequately compensate for wetland functions and values that are lost or diminished. Simple comparisons of area altered with area restored or created may not provide an accurate picture of the net change in, say, wildlife habitat and other values. Our study was not designed to evaluate the functions and values of mitigation areas. Moreover, we were not even able to quantify according to the system of Cowardin et al. (1979) the types of wetlands being restored or created because information in the files was often non-specific, some of the mitigation had not yet taken place, and some of the mitigation sites were not accessible. We suspect, on the basis of our visits to these sites, that there may be a tendency to compensate for vegetated wetlands by restoring or creating open-water areas.

Another concern of natural resource agencies is whether or not NWP 26 meets the criteria for General Permits. Activities authorized under General Permits must be similar in nature, comply with the Section 404(b)(1) Guidelines, and must have only minimal individual and cumulative effects. The apparent intent of this portion of the Clean Water Act was to avoid repetitive, case-by-case evaluation of activities that, as a class, could be demonstrated ahead of time to be in compliance with EPA regulations and could be shown to have similar insignificant effects on waters of the United States. General Permits meeting these criteria would presumably allow agencies involved in the permitting process to concentrate their efforts on more important projects. Our data indicate that activities authorized under NWP 26 are as variable as those authorized under Individual Permits. In fact, the only common feature of activities authorized under NWP 26 seems to be that they occur in small wetlands that are either above the headwaters or isolated. It seems unlikely that the effects of such variable activities can be shown in advance to be similar and insignificant.

The question of compliance with the Section 404(b)(1) Guidelines revolves around the issues of practicable alternatives and water dependency. The guidelines state that no discharge of dredged or fill material shall be permitted if there is a practicable alternative that would have a less adverse effect on

the aquatic ecosystem. The guidelines also establish two rebuttable presumptions: (1) practicable alternatives exist for activities that are not dependent on being located in a special aquatic site (e.g., wetland) to fulfill their basic purpose (i.e., are not water dependent), and (2) all practicable alternatives not involving a discharge in a special aquatic site have less adverse effects on the aquatic ecosystem. The guidelines clearly place the burden of rebutting these presumptions on the project proponent.

Many of the projects (e.g., housing developments, shopping centers, restaurants, airports) reviewed in this study were not dependent on being located in a special aquatic site to fulfill their basic purpose. However, such projects can still be authorized under Section 404 if they meet the practicable alternatives test. We suspect that projects authorized under NWP 26 receive much less scrutiny for practicable alternatives because of the 20-day processing period for those between 1 and 10 acres and because those <1 acre are not reviewed by regulatory and resource agencies.

Also, we must consider cumulative effects resulting from activities authorized under NWP 26. Cumulative effects are difficult to define and even more difficult to measure. Nevertheless, we found that alterations authorized under NWP 26 composed a significant fraction of the total alterations permitted under Section 404. Furthermore, we believe that the cumulative effects of these alterations may be significant in a state such as Colorado, where wetlands compose less than 5% of the land area but are used by 90% of the wildlife species (U.S. Fish and Wildlife Service 1990).

Acknowledgments

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Appendix. Basic Data for Nationwide Permit 26 and Individual Permits

"Unknown" as an entry for wetland type in the following tables indicates either that the map in the permit file was inadequate for locating the wetland on the National Wetlands Inventory (NWI) map or that the NWI map showed no wetland at the project location.

Permit numbers for Individual Permits are abbreviated in the following tables. The numbers for all Individual Permits reviewed in this study were prefixed by "CO 2SB OXT 2."

For Individual Permits, magnitude of the action was described in terms of acres, volume of material discharged, or both. If neither measure of magnitude was found in the file, "Unknown" was entered in the column labeled volume.

Wetland types follow the classification of Cowardin et al. (1979).

Table A-1. *Basic data on Nationwide Permit 26 for 1985.*

Permit number	Wetland type	Area affected (acres)	Project type
Nationwide Permit 26 (<1 acre)			
CO 85-002	L10WKZ	<1	Housing
CO 85-009	PFOW, R4SBKC	<1	Culvert
CO 85-025	Unknown	0.33	Unknown
CO 85-026	Unknown	<1	Softball field
CO 85-028	R4SBKY	<1	Channel improvement
CO 85-029	PEMC, R4SBAx	<1	Drainage improvement
CO 85-072	PFOW	<1	Bank stabilization
CO 85-077	Unknown	<1	Highway development
CO 85-086	PEMC	<1	Housing
CO 85-091	Unknown	<1	Road widening
CO 85-093	Unknown	<1	Unknown
CO 85-094	PEMY	<1	Drainage improvement
CO 85-095	PEMY	<1	Pipe installation
CO 85-097	PEMY	<1	Unknown
CO 85-098	PEMC, R4SBFx	<1	Channel improvement
Nationwide Permit 26 (1-10 acres)			
CO 85-045	PFLKY	10.0	Unknown
CO 85-049	POWKF	2.4	Mall development ^a
CO 85-065	PEMY	1.2	Housing development
CO 85-070	PEMW	1.81	Channel improvement ^a

^a Information in permit file indicates that developer considered and may have implemented wetland restoration or creation as mitigation.

Table A-2. *Basic data on Nationwide Permit 26 for 1986.*

Permit number	Wetland type	Area affected (acres)	Project type
Nationwide Permit 26 (<1 acre)			
CO 86-006	POWF, P SS/EM C	<1	Highway development
CO 86-009	Unknown	<1	Bridge construction
CO 86-010	PFOW, PEMW	0.6	Creek relocation
CO 86-011	Unknown	<1	Detention pond
CO 86-012	PFOW	<1	Well drilling*
CO 86-015	PEMY, POWKF	<1	Unknown
CO 86-021	PUBF _x	<1	Park development
CO 86-025	R4SBKC	<1	Channel improvement
CO 86-031	Unknown	<1	Unknown
CO 86-039	PEMC	<1	Riprapping
CO 86-040	PSSW, R4SBW	<1	Bridge replacement
CO 86-043	PEMC, PEMF	0.90	Unknown
CO 86-044	POWKZ	0.46	Channelization
CO 86-049	PEMY	<1	Channelization
CO 86-064	Unknown	0.15	Housing development
CO 86-068	R4SBF _x	<1	Erosion control
CO 86-069	Unknown	<1	Filling and grading
CO 86-070	Unknown	0.79	Unknown
CO 86-078	Unknown	<1	Road construction
CO 86-079	PEMF	0.37	Street widening
CO 86-080	P SS/EM C	<1	Road construction
CO 86-081	PUBF _x	<1	Unknown
CO 86-082	Unknown	<1	Channel improvement
CO 86-085	R4SBF _x	0.69	Channelization
CO 86-086	Unknown	<1	Dam and road crossing
CO 86-088	PFOW	<1	Channelization
CO 86-089	Unknown	<1	Settlement basins
CO 86-091	PEMY	<1	Unknown
CO 86-093	R4SBC	<1	Bicycle trail
CO 86-095	Unknown	0.7	Riprapping
CO 86-096	Unknown	<1	Berm construction
CO 86-098	Unknown	<1	Dam and duck island
CO 86-100	P SS/EM C	<1	Bridge and pond construction
CO 86-102	PEMW	0.4	Street widening
CO 86-106	PEMW	0.77	Channel construction
CO 86-111	Unknown	0.11	Housing
CO 86-116	POWKZ, L2FLKY	<1	Bank modification
CO 86-118	Unknown	0.86	Parking lot
CO 86-120	PFLKW, POWKF	<1	Distilling pond
CO 86-124	PFOW, R2OWZ	<1	Sewer crossing
CO 86-132	R4SBA	0.73	Channelization
CO 86-136	Unknown	0.2	Diversion berms
CO 86-137	P SS/EM C	0.04	Unknown
CO 86-138	PEMC, PSSAx	0.65	Channelization
CO 86-139	R4SBY	0.9	Culvert
CO 86-149	Unknown	0.84	Channelization
Nationwide Permit 26 (1-10 Acres)			
CO 86-005	PEMW	2.02	Road construction ^b
CO 86-046	PEMC	1.58	Unknown
CO 86-047	POWKF	1.7	Golf course ^b

Table A-2. *Continued.*

Permit number	Wetland type	Area affected (acres)	Project type
CO 86-067	PEMY	3.5	Housing ^b
CO 86-107	R4SBC, R4SBF	1.25	Bridge construction ^b
CO 86-146	PEMC	2.41	Channelization and path

^a Wetland was adjacent to South Platte River; an Individual Permit should have been required.

^b Information in permit file indicates that developer considered and may have implemented wetland restoration or creation as mitigation.

Table A-3. *Basic data on Nationwide Permit 26 for 1987.*

Permit number	Wetland type	Area affected (acres)	Project type
Nationwide Permit 26 (<1 acre)			
CO 87-002	Unknown	<1	Dam construction
CO 87-009	PEMW	0.22	Channelization
CO 87-013	Unknown	0.18	Drain improvement
CO 87-017	R4SBF _x	0.1	Bank protection
CO 87-023	R4SBF _x	0.83	Park improvement
CO 87-024	Unknown	<1	Housing
CO 87-027	PFLY	0.73	Unknown
CO 87-031	Unknown	<1	Channel improvement
CO 87-032	POWKF	0.95	Water detention
CO 87-033	Unknown	<1	Placer mining
CO 87-048	Unknown	0.2	Channelization
CO 87-054	Unknown	0.5	Unknown
CO 87-057	Unknown	0.18	Channelization
CO 87-060	Unknown	0.7	Peat mining
CO 87-061	PEMY	0.06	Culvert
CO 87-063	P SS/EM C	<1	Pipeline
CO 87-065	P SS/EM C	0.6	Park development
CO 87-067	Unknown	0.41	Storm sewer
CO 87-068	R4SBW, PFLW	0.85	Bridge and channel
CO 87-069	PSSW	0.23	Bridge construction
CO 87-071	PEMY, R4SBK _C	0.8	Unknown
CO 87-072	Unknown	0.76	Road construction
CO 87-074	L10WKZ	<1	Unknown
CO 87-076	Unknown	0.1	Mining
CO 87-078	R4SBC	0.1	Channelization
CO 87-080	PEMY	<1	Unknown
CO 87-081	PEMF	0.4	Channelization
CO 87-083	Unknown	0.4	Housing
CO 87-084	PFOW	0.12	Road construction
CO 87-085	PEMK _C	0.87	Channel improvement
CO 87-099	Unknown	<1	Drain construction
CO 87-100	PFLY	0.78	Landfill
CO 87-103	Unknown	<1	Dam improvement
CO 87-104	PEMC	0.5	Drop structures

Table A-3. *Continued.*

Permit number	Wetland type	Area affected (acres)	Project type
CO 87-106	Unknown	0.06	Ditch construction
CO 87-112	PEMC, POWF	0.1	Road construction
CO 87-117	POWKZ	0.3	Unknown
CO 87-119	Unknown	0.5	Drain improvement
CO 87-120	Unknown	0.5	Road construction
CO 87-124	L1OWZ	0.3	Dam replacement
CO 87-129	PEMC	0.1	Detention pond
CO 87-132	Unknown	0.91	Unknown
CO 87-134	PEMKC	0.41	Unknown
CO 87-137	R2USC	0.9	Unknown
CO 87-139	PEMY	0.89	Housing
CO 87-141	PSSC	0.03	Diversion structure
CO 87-149	Unknown	0.83	Unknown
CO 87-150	Unknown	0.03	Stabilization
CO 87-151	PEMC	0.76	Unknown
CO 87-152	PEMW	0.03	Unknown
CO 87-153	PEMY	0.92	Unknown
CO 87-158	Unknown	0.11	Storm sewer
CO 87-161	PEMW, PEMC	0.32	Channelization
CO 87-162	L1OWKZ	0.9	Temporary dikes
Nationwide Permit 26 (1-10 acres)			
CO 87-025	Unknown	2.1	Road construction
CO 87-110	PEMY	9.5	Road construction ^a
CO 87-133	PEMC	1.77	Unknown

^a Information in permit file indicates that developer considered and may have implemented wetland restoration or creation as mitigation.

Table A-4. *Basic data on Nationwide Permit 26 for 1988.*

Permit number	Wetland type	Area affected (acres)	Project type
Nationwide Permit 26 (<1 acre)			
CO 88-002	Unknown	0.3	Channelization
CO 88-004	Unknown	<1	Unknown
CO 88-005	Unknown	0.8	Channel improvement
CO 88-010	Unknown	0.89	Unknown
CO 88-012	PEMC	0.97	Dam and inundation
CO 88-032	PFOA	<1	Bridge construction
CO 88-033	Unknown	0.04	Dam and stream restoration
CO 88-037	Unknown	<1	Highway construction
CO 88-038	PEMC	0.08	Bridge construction
CO 88-041	PEMKC	0.5	Housing
CO 88-045	Unknown	0.99	Channelization
CO 88-046	Unknown	0.48	Channel improvement
CO 88-047	PEMY, R4SBKC	0.4	Channel improvement
CO 88-048	PFOA	0.98	Housing
CO 88-049	PEMC	0.90	Unknown
CO 88-052	Unknown	0.2	Bridge replacement
CO 88-062	Unknown	0.57	Sediment trap
CO 88-065	PABFh, PEMFh	<1	Channel improvement

Table A-4. *Continued.*

Permit number	Wetland type	Area affected (acres)	Project type
CO 88-066	PEMW	<1	Outfall structure
CO 88-068	Unknown	0.1	Road construction
CO 88-069	Unknown	0.07	Drop structure
CO 88-070	Unknown	<1	Weir installation
CO 88-072	PEMC, R4SBC	0.14	Road construction
CO 88-073	Unknown	<1	Unknown
CO 88-076	POWFK, PEMY	<1	Bridge crossing
CO 88-077	Unknown	0.02	Mining waste discharge
CO 88-078	Unknown	<1	Settling pond
CO 88-079	Unknown	0.03	Bike trail
CO 88-080	R4SBY	0.60	Water main extension
CO 88-083	P SS/EM C	0.9	Dam construction
CO 88-084	Unknown	0.7	Unknown
CO 88-085	Unknown	0.34	Unknown
CO 88-088	PEMC	0.3	Channelization
CO 88-089	PEMC	0.61	Detention pond
CO 88-090	PEMC	0.1	Bank stabilization
CO 88-091	Unknown	<1	Detention control
CO 88-093	Unknown	0.6	Housing
CO 88-098	L1OWZ	0.70	Park development
CO 88-099	Unknown	0.70	Drainage improvement
CO 88-101	Unknown	0.5	Dam repair
CO 88-104	PEMC	0.76	Parking lot
CO 88-105	P SS/EM W	0.89	Channelization
CO 88-106	Unknown	<1	Highway construction
CO 88-108	Unknown	0.52	Unknown
CO 88-109	R2OWZ	<1	Drainage improvement
CO 88-112	Unknown	0.13	Parking lot
CO 88-114	Unknown	<1	Channelization
CO 88-115	PEMKC	0.69	Channelization
CO 88-119	Unknown	0.32	Channelization
CO 88-125	PEMF, PSSC	0.10	Channelization
CO 88-128	PEMF	0.15	Culvert
CO 88-131	Unknown	0.10	Channelization
CO 88-133	Unknown	0.95	Unknown
CO 88-135	Unknown	0.7	Unknown
CO 88-139	Unknown	0.47	Park development
CO 88-143	PFLY, POWF	0.64	Road widening
CO 88-144	Unknown	0.70	Channelization
CO 88-146	R4SBA, PSSA	0.57	Bridge crossing
CO 88-148	Unknown	0.3	Unknown
CO 88-151	PEMY	0.82	Channelization
CO 88-152	Unknown	0.7	Dams and erosion control
CO 88-157	P SS/EM C	0.20	Pond improvement
CO 88-159	Unknown	0.1	Road construction
Nationwide Permit 26 (1–10 acres)			
CO 88-057	R2OWZ	8.8	Unknown ^a
CO 88-092	PEMY	1.45	Highway construction ^a
CO 88-094	Unknown	2.7	Unknown
CO 88-111	PEMC	1.1	Unknown ^a

^a Permit file indicated that developer considered and may have implemented wetland restoration or creation as mitigation.

Table A-5. *Basic data on Nationwide Permit 26 for 1989.*

Permit number	Wetland type	Area affected (acres)	Project type
Nationwide Permit 26 (<1 acre)			
CO 89-001	PEMC	0.15	Road construction
CO 89-003	R4SBFx	0.41	Drop structures
CO 89-006	Unknown	0.1	Channel improvement
CO 89-009	R4SBW	0.1	Bridge replacement
CO 89-010	Unknown	0.18	Storm drain
CO 89-011	Unknown	<1	Road construction
CO 89-014	Unknown	0.31	Channel improvement
CO 89-015	Unknown	0.55	Channelization
CO 89-016	Unknown	0.02	Unknown
CO 89-017	POWKZ	0.36	Unknown
CO 89-018	PEMC	0.78	Housing
CO 89-019	PEMY	0.35	Housing
CO 89-021	Unknown	0.07	Unknown
CO 89-023	Unknown	0.5	Unknown
CO 89-024	Unknown	0.93	Unknown
CO 89-025	Unknown	<1	Bridge repair
CO 89-026	R4SBA	0.3	Drop structure
CO 89-030	PEMY	0.35	Unknown
CO 89-031	R4SBFx	0.02	Bank stabilization
CO 89-034	POWF	0.25	Unknown
CO 89-039	PEMY	0.95	Unknown
CO 89-041	PEMC	0.13	Unknown
CO 89-043	Unknown	0.33	Drain improvement
CO 89-045	Unknown	0.01	Diversion structure
CO 89-046	POWF	0.5	Street widening
CO 89-048	PEMY	0.13	Unknown
CO 89-050	Unknown	0.41	Drain improvement
CO 89-053	PEMF	0.1	Unknown
CO 89-054	Unknown	0.83	Unknown
CO 89-059	PFOW, R4SBW	0.1	Unknown
CO 89-064	POWF, PEMY	0.02	Unknown
CO 89-066	PEMC	0.30	Park development
CO 89-068	PEMW	0.96	Dam and diversion
CO 89-073	PEMY	0.47	Unknown
CO 89-074	Unknown	<1	Unknown
CO 89-075	Unknown	0.55	Unknown
CO 89-077	PEMC	0.1	Outfall structure
CO 89-079	Unknown	0.20	Concrete gutter
CO 89-084	Unknown	0.04	Unknown
CO 89-086	Unknown	0.16	Dam construction
CO 89-087	Unknown	<1	Peat storage
CO 89-090	Unknown	0.8	Channelization
CO 89-092	Unknown	0.1	Park development
CO 89-094	Unknown	0.1	Park development
CO 89-095	R4SBKC	0.55	Channel development
CO 89-101	P SS/EM C	0.8	Unknown
CO 89-105	PEMY	0.1	Sewer crossing
CO 89-107	PEMC	0.1	Sewer crossing
CO 89-109	R4SBA	0.4	Bridge and channel
CO 89-111	Unknown	0.9	Dam construction
CO 89-112	L10WKZ	0.99	Housing
CO 89-113	Unknown	<1	Dam construction

Table A-5. *Continued.*

Permit number	Wetland type	Area affected (acres)	Project type
CO 89-117	Unknown	<1	Culvert
CO 89-123	PEMF, PABFh	0.5	Channel improvement
CO 89-125	POWF, PEMY	0.2	Waterline
CO 89-129	R4SBY	0.05	Road realignment
CO 89-134	PEMKC, POWKZ	0.30	Drain improvement
CO 89-135	Unknown	0.18	Road widening
CO 89-137	Unknown	0.51	Parking lot
CO 89-139	Unknown	0.86	Park development
CO 89-141	POWF	0.45	Pond improvement
CO 89-143	PEMC	0.08	Channelization
CO 89-144	PEMC	0.22	Channelization
CO 89-145	PEMW	<1	Bridge construction
CO 89-146	PEMW	0.34	Bridge construction
CO 89-148	R4SBY	0.4	Culvert
CO 89-155	R4SBKC	0.56	Trailer wash
CO 89-161	PEMC	0.01	Unknown
CO 89-162	Unknown	0.38	Unknown
CO 89-164	Unknown	0.19	Channelization
CO 89-165	R2OWZ	0.7	Gravel mining
Nationwide Permit 26 (1-10 acres)			
CO 89-033	Unknown	1.65	Unknown ^a
CO 89-114	PEMY	1.5	Golf course development ^a
CO 89-121	PEMC, POWF, POWKz	4.75	Unknown ^a

^a Permit file indicated that developer considered and may have implemented wetland restoration or creation as mitigation.

Table A-6. *Basic data on Individual Permits for 1985.*

Permit number	Wetland type	Magnitude of action		Project type
		Area (acres)	Volume (cubic yards)	
03803	R2OWZ	3.8		Sediment basin
06241	R2SB	0.17		Bank stabilization
07013	R2OWZ		400	Temporary dike
07021	R2OWZ		750	Pipeline crossing
07067	R3OWZ		1,400	Dam replacement
07107	R2OWZ		3,500	Bridge protection
07108	R2OWZ		6,600	Channel improvement
07109	R2OWZ		6,600	Channel improvement
07174	R2OWZ		Unknown	Bank improvement
07334	R2OWZ		95	Pipeline crossing
07335	R2OWZ		140	Pipeline crossing
07343	L1OWKZ	1.3		Housing
07351	R2OWZ		2,500	Bridge repair
07487	R4SBF	13.4	175,050	Flood control
07597	R2OWZ		6,000	Bank stabilization
07715	R2OWZ		2,540	Cofferdam
07746	R2OWZ		1,000	Crossing
07823	R2OWZ		1,000	Gravel mining
07979	R2OWZ		360	Sewer crossing

Table A-7. *Basic data on Individual Permits for 1986.*

Permit number	Wetland type	Magnitude of action		Project type
		Area (acres)	Volume (cubic yards)	
07258	R4SBF	8.1		Channel improvement
07760	R2OWZ		3,000	Bridge replacement
07827	R2OWZ		600	Sewer crossing
07926	PEMY/L1OWKZ	1.2	5,800	Race track
07927	R4SBF		840	Pipeline crossings
07933	R2OWZ		Unknown	Sewer crossing
07968	PFOW		360	Sewer crossing
08093	POWKZ		Unknown	Channel restoration
08118	R3OWZ		404	Water intake
08126	P SS/EM C		308	Bank stabilization
08136	R4SBC		600	Bank stabilization
08166	PSSA		Unknown	Cofferdams and conduit
08196	PEMY ^a	0.4		Channelization
08210 ^b	PABFh	43.0		Sand and gravel mining
08211	PEMY	1.3		Stormwater detention
08216	R2OWZ		600	Sewer crossing
08217	PFOW, PEMW		960	Sewer crossing
08264	R4SBC, POWKZ	17.0		Road construction
08273	PEMW, PFOW	0.7	47,000	Flood control
08361	PFOW	0.23		Channelization
08459	PEMC/PUSC	16.4		Reservoir construction
08469	PEMW, PFOW	9.75		Irrigation and habitat development
08470	R2OWZ		Unknown ^c	Drop structure
08524	PFOW	1.21		Road construction
08525	PEMY		240	Water conduit
08541	R2OWZ, L1UBHx		Unknown	Channelization
08593	PEMC	0.13		Bridge and channel improvement
08728	L1OWKZ		15,000	Road construction
08751	R2UBG	1.1		Bridge construction
08870	PSSA	0.11		Bridge replacement
08892	P SS/EM C		1,334	Dam and pond construction
08899	R2BBW, PFOW	1.45		Dam and pond construction
08925	Unknown		Unknown	Bridge replacement
08968	R2OWZ/R2BBW		1,000	Pipeline crossing
09103	PFOW	0.3		Channel realignment
09160	R2OWZ		1,700	Diversion structure
09181	R4SBF		349	Bank stabilization

^a This wetland was identified in the Service response to the Public Notice as being of this type. No wetland was delineated on the National Wetlands Inventory map in the project area.

^b This work was also continued under Individual Permits 08641 and 08642.

^c Permit allowed a fill of 53 tons of 16-inch granite. No volume was specified.

Table A-8. *Basic data on Individual Permits for 1987.*

Permit number	Wetland type	Magnitude of action		Project type
		Area (acres)	Volume (cubic yards)	
08083	R2OWZ		1,950	Riprapping
09100	R2OWZ		3,700	Bridge replacement
09158	Unknown	3.0		Channelization
09174	L1OWKZ		650	Riprapping
09181	R4SBF		349	Riprapping
09219	L1OWKZ		65	Boat ramp
09220	R2OWZ		12,900	Drop structure
09222	R2OWZ		450	Riprapping
09231	R2OWZ		4,160	Bank stabilization
09329	PEMF, PFOA	20.0		Housing
09355	R2OWZ		4,530	Riprapping
09416	PSSC/R2USC		355	Powerline crossing
09428	R2OWZ		1,962	Bridge replacement
09431	PEMY	0.1		Road construction
09456	PFOW		Unknown	Channel improvement
09495	R2OWZ		1,370	Bank stabilization
09505	R2OWZ		740	Bank stabilization
09584	R2OWZ		1,300	Bank stabilization
09710	R2OWZ		290	Bridge construction
09781	R2OWZ		339	Bank stabilization
09806	R2OWZ	0.22		Bridge replacement
09891	R2OWZ		230	Bridge replacement
09943	R2OWZ		900	Pipeline crossing
10089	PSSC/PUBFx		693	Sewer crossing
10112	R2OWZ		770	Bank stabilization
10123	PSSC		348	Wetlands improvement
10185	R4BSF		Unknown	Outfall structure
10246	R2OWZ		3,200	Bridge replacement

Table A-9. *Basic data on Individual Permits for 1988.*

Permit number	Wetland type	Magnitude of action		Project type
		Area (acres)	Volume (cubic yards)	
07295	PEMFh/PSSCh	3.63		Shopping center
09219	L1OWKZ		68	Boat ramp
10036	PEMC	12.3		Park development
10123	PSSC		Unknown	Property improvement
10419	R2UBH		2,400	Riprapping
10495	R4SBA	0.3		Bridge construction
10537	R4SBY		75	Pipeline crossing
10597	R2OWZ		600	Bank stabilization
10601	PSSA		60,100	Channel improvement
10616	R2OWZ		922	Bridge replacement
10629	R3OWZ	2.5		Road improvement
10632	R3OWZ		691	Bridge construction
10790	R3OWZ		130	Berm
10795	R2OWZ		1,530 ^a	Bridge repair
10959	PEMW	0.08		Property improvement
11159	R2OWZ		5,000	Bridge replacement
11197	R2OWZ		5,040	Bridge replacement
11201	R4SBF		385	Bridge widening
11308	R2OWZ		411	Bank stabilization
11321	R2OWZ		2,850	Channelization
11488	Unknown	21.82		Channelization
11569	R2OWZ	0.5		Park development
11732	Unknown	4.68		Building project
11757	R2OWZ		100	Water intake
11815	R2OWZ	0.56		Bridge construction
11827	PFOW	0.4		Unknown
11879	R4SBY	10.5		Channel realignment
11952	R4SBY	0.34		Bridge construction
11964	R2OWZ		4,200	Pipeline crossing
11994	R2OWZ		2,740	Bridge replacement
12333	R2OWZ		Unknown	Bridge replacement

^a This permit also allowed placement of 345 tons of rock for a drop structure.

Table A-10. *Basic data on Individual Permits for 1989.*

Permit number	Wetland type	Magnitude of action		Project type
		Area (acres)	Volume (cubic yards)	
09360	PEMF, PFOA	9.7	105,700	Housing
11953	PFOW	0.11		Mining
11984	R2UBG		1,575	Pipeline crossing
12260	Unknown		800	Restaurant
12355	L2UBGh		2,400	Boat ramp
12591	PEMC	9.7		Lake construction
12683	R2OWZ		150	Diversion pond
12842	R2OWZ		1,270	Bank stabilization
12867	R4SBY/PFOW	2.75		Golf course
12938	R3OWZ		1,800	Berm and pond
12992	R4SBY	0.05		Bridge replacement
13200	Unknown	15.0		Airport
13464	R4SBF	0.31		Unknown
13466	POWKZ	2.3		Pond expansion
13889	R3OWZ	0.44		Bridge replacement
13890	R3OWZ	0.04	222	Road improvement
13891	R3OWZ		3,300	Channel improvement
14141	Unknown		2,500	Bank protection

A list of current *Resource Publications* follows.

166. Checklist of Vertebrates of the United States, the U.S. Territories, and Canada, by Richard C. Banks, Roy W. McDiarmid, and Alfred L. Gardner. 1987. 79 pp.
167. Field Guide to Wildlife Diseases. Vol. 1. General Field Procedures and Disease of Migratory Birds, by Milton Friend, Cynthia J. Laitman, and Randy Stothard Kampen. 1987. 225 pp.
168. Mourning Dove Nesting: Seasonal Patterns and Effects of September Hunting, by Paul H. Geissler, David D. Dolton, Rebecca Field, Richard A. Coon, H. Franklin Percival, Don W. Hayne, Lawrence D. Soileau, Ronnie R. George, James H. Dunks, and S. Dwight Bunnell. 1987. 33 pp.
169. Saltcedar Control for Wildlife Habitat Improvement in the Southwestern United States, by Theodore A. Kerpez and Norman S. Smith. 1987. 16 pp.
170. Pesticide Use and Toxicology in Relation to Wildlife: Organophosphorus and Carbamate Compounds, by Gregory J. Smith. 1987. 171 pp.
171. Sand and Gravel Pits as Fish and Wildlife Habitat in the Southwest, by William J. Matter and R. William Mannan. 1988. 11 pp.
172. Satellite Telemetry: A New Tool for Wildlife Research and Management, by Steven G. Fancy, Larry F. Pank, David C. Douglass, Catherine H. Curby, Gerald W. Garner, Steven C. Amstrup, and Wayne L. Regelin. 1988. 54 pp.
173. Key to Acanthocephala Reported in Waterfowl, by Malcolm E. McDonald. 1988. 45 pp.
174. Obsolete English Names of North American Birds and Their Modern Equivalents, by Richard C. Banks. 1988. 37 pp.
175. Procedures for the Analysis of Band-recovery Data and User Instructions for Program MULT, by Michael J. Conroy, James E. Hines, and Byron K. Williams. 1989. 61 pp.
176. Sago Pondweed (*Potamogeton pectinatus* L.): A Literature Review, by Harold A. Kantrud. 1990. 89 pp.
177. Field Manual for the Investigation of Fish Kills, by Fred P. Meyer and Lee A. Barclay. 1990. 120 pp.

NOTE: Use of trade names does not imply U.S. Government endorsement of commercial products.



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