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Report to Congressional Requesters

August 2003

NATIONAL WILDLIFE REFUGES

Opportunities to Improve the Management and Oversight of Oil and Gas Activities on Federal Lands

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GAO-03-517

August 2003

NATIONAL WILDLIFE REFUGES

Opportunities to Improve the Management and Oversight of Oil and Gas Activities on Federal Lands

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Highlights

Highlights of GAO-03-517, a report to congressional requesters

Why GAO Did This Study

The 95-million acre National Wildlife Refuge System contains federal lands devoted to the conservation and management of fish, wildlife, and plant resources. While the federal government owns the surface lands in the system, in many cases private parties own the subsurface mineral rights and have the legal authority to explore for and extract oil and gas. GAO was asked to determine the extent of oil and gas activity on refuges, identify the environmental effects, and assess the Fish and Wildlife Service's management and oversight of oil and gas activities.

What GAO Recommends

In a draft of this report, GAO made several recommendations to enhance the Fish and Wildlife Service's management of oil and gas activities, including collecting better data; improving training, oversight, and land acquisition practices; and strengthening permitting authority. GAO also recommended that the Service seek additional authority to regulate private mineral rights.

In response to comments received from the Department of the Interior, GAO has clarified its position as to the means that the Service could use to improve oversight. Also, in light of Interior's comments indicating a perceived inability to request additional authority, GAO is asking Congress to consider expanding the Service's authority to regulate private mineral rights.

www.gao.gov/cgi-bin/getrpt?GAO-03-517.

To view the full product, including the scope and methodology, click on the link above. For more information, contact William R. Swick at (206) 287-4851 or swickw@gao.gov.

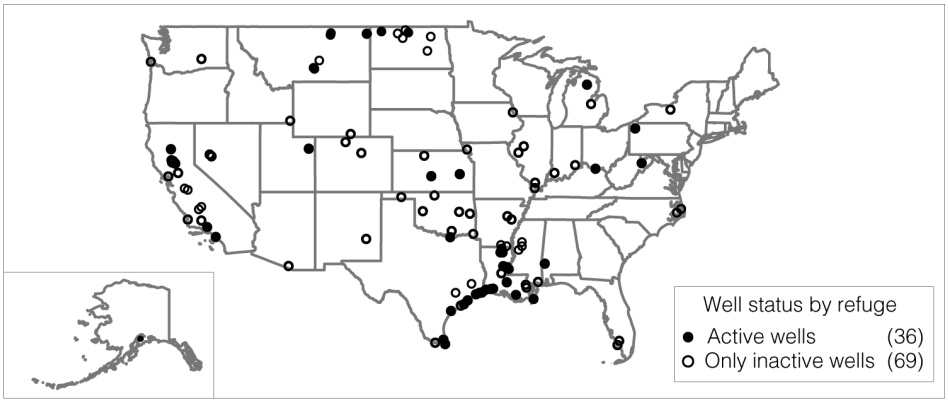
What GAO Found

About one-quarter (155 of 575) of all refuges have past or present oil and gas activity, some dating to at least the 1920s. Activities range from exploration to drilling and production to pipelines transiting refuge lands. One hundred five refuges contain a total of 4,406 oil and gas wells—2,600 inactive wells and 1,806 active wells. The 1,806 wells, located at 36 refuges and many around the Gulf Coast (see figure), produced oil and gas valued at $880 million during the last 12 month reporting period, roughly 1 percent of domestic production. Thirty-five refuges contain only pipelines.

The Fish and Wildlife Service has not assessed the cumulative environmental effects of oil and gas activities on refuges. Available studies, anecdotal information, and GAO's observations show that the environmental effects of oil and gas activities vary from negligible, such as from buried pipelines, to substantial, such as from large oil spills or from large-scale infrastructure. These effects also vary from the temporary to the longer term. Some of the most detrimental effects of oil and gas activities have been reduced through environmental laws and improved practices and technology. Moreover, oil and gas operators have taken steps, in some cases voluntarily, to reverse damages resulting from oil and gas activities.

Federal management and oversight of oil and gas activities varies widely among refuges--some refuges take extensive measures, while others exercise little control or enforcement. GAO found that this variation occurs because of differences in authority to oversee private mineral rights and because refuge managers lack enough guidance, resources, and training to properly manage and oversee oil and gas activities. Greater attention to oil and gas activities by the Fish and Wildlife Service would increase its understanding of associated environmental effects and contribute to more consistent use of practices and technologies that protect refuge resources.

National Wildlife Refuges with Oil and Gas Wells



Source: Premier Data Services (data) and GAO (analysis).

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Abbreviations

CAP	Contaminant Assessment Process
FWS	Fish and Wildlife Service
NPMS	National Pipeline Mapping System
NWR	National Wildlife Refuge
PCB	polychlorinated biphenyls
RMIS	Refuge Management Information System
VOC	volatile organic compounds
WMA	Wildlife Management Area
WMD	Wetland Management District

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Accountability * Integrity * Reliability

United States General Accounting Office
Washington, D.C. 20548

August 28, 2003

The Honorable Wayne T. Gilchrest
Chairman
Subcommittee on Fisheries Conservation,
Wildlife, and Oceans
Committee on Resources
House of Representatives

The Honorable Edward J. Markey
House of Representatives

The mission of the National Wildlife Refuge System, as expressed in its governing legislation, is to "administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." The system is unique in that the 95 million acres of land in the system are the only federal lands managed primarily for the benefit of wildlife, providing habitat for native plants and animals, including endangered or threatened species, as well as important way points for migrating species, such as ducks, cranes, and eagles. The system, which represents more than 14 percent of all federal lands and has a presence in every state, is administered by the Department of the Interior's Fish and Wildlife Service and includes both land that has always been federally owned and land that has been acquired from others. While the federal government owns almost all the surface lands in the system, in many cases the federal government does not own the subsurface mineral rights. Subject to some restriction, owners of subsurface mineral rights have the legal authority to explore for mineral resources such as oil and gas and, if such resources are found, to extract them.

In October 2001, we reported that the Fish and Wildlife Service recognized some type of oil and gas activity on 77 of the 567 refuges and wetland management districts within the National Wildlife Refuge System in

calendar year 2000.[1] However, our report recognized that this accounting of activities might be incomplete because the data were based on refuges' self-reporting. Therefore, to gain a more complete assessment of oil and gas activities, you asked us to (1) determine the nature and full extent of oil and gas activities in the National Wildlife Refuge System, (2) identify environmental effects of oil and gas activities on refuge resources, and (3) assess the Fish and Wildlife Service's management and oversight of these activities.

Our updated information on the extent of past and present oil and gas activities within current wildlife refuge boundaries is based on a variety of sources. Using national geographic information databases, we determined how many documented oil and gas wells and transit pipelines were located within or immediately proximate to refuge boundaries. We also used Fish and Wildlife Service records to identify other evidence of oil and gas activities. Premier Data Services, a firm with extensive experience in computer-based geographic information systems and oil and gas leasing, aided our data acquisition and analysis (see app. IV). Our analysis is more extensive than any undertaken by the Fish and Wildlife Service or the Department of the Interior, and at their request, we are providing our database to them for future use.

We visited 16 refuges, representing a range of type and scale of oil and gas activities and environmental effects. At each refuge, we asked the refuge manager to describe the range of environmental effects of these oil and gas activities, obtained any available studies of the effects, and visited selected locations of oil and gas activity to observe actual conditions.

To assess the authority of the Fish and Wildlife Service to manage and oversee oil and gas activities on refuges, we obtained information from the Department of the Interior's Office of the Solicitor and reviewed the laws and regulations pertaining to the Fish and Wildlife Service and other federal land management agencies and recent court cases concerning private mineral rights on federal lands. To assess the Fish and Wildlife

[1] U.S. General Accounting Office, *U.S. Fish and Wildlife Service: Information on Oil and Gas Activities in the National Wildlife Refuge System*, GAO-02-64R (Washington, D.C.: Oct. 31, 2001). The National Wildlife Refuge System, at that time, consisted of 530 refuges as well as 37 wetland management districts, which are management entities created to administer waterfowl production areas. In this report, we use the term "refuge" to refer to any unit of the National Wildlife Refuge System, including national wildlife refuges, wildlife ranges, wildlife management areas, and waterfowl production areas.

Service's management and oversight of oil and gas activities, we obtained information on policy, guidance, and practices from headquarters and the 7 regional offices and documented the actual practices in use at the 16 refuges we visited.

Results in Brief

About one-quarter, or 155, of the 575 refuges, have past or current oil and gas activities, some dating to at least the 1920s. These activities include oil and gas exploration, active and inactive drilling and production facilities, and active pipelines transiting refuge lands. As of December 2002, 4,406 oil and gas wells were located on 105 refuges, with many of the wells concentrated in Louisiana and Texas. Of the 4,406 wells on refuge lands, a majority (2,600 wells) were inactive, either permanently plugged and abandoned or temporarily idled with the possibility of future activation. Thirty-six refuges have 1,806 active wells and more than half of these are located in just 5 refuges. Since 1994, oil and gas exploration has occurred at 44 refuges. In addition, at least 1 active pipeline is present at 107 refuges, 35 of which do not have any other oil and gas activity. During the most recent 12-month reporting period, the 1,806 active wells produced 23.7 million barrels of oil and 88.2 million cubic feet of natural gas, about 1.1 and 0.4 percent of total domestic oil and gas production, respectively. Based on 2001 average prices, refuge-based production had an estimated total commercial value of $880 million.

The Fish and Wildlife Service has not conducted any assessments of the cumulative environmental effects of oil and gas activities on refuge resources. Available studies, anecdotal information, and our observations show that the environmental effects of oil and gas activities and the associated construction, operation, and maintenance of the infrastructure on wildlife and habitat vary in severity, duration, and visibility. For example, the environmental effects range from infrequent small oil spills and minimal debris from abandoned infrastructure to large and chronic spills and large-scale industrial development. Some damage, such as habitat loss from infrastructure development, may last indefinitely, while other damage, such as wildlife disturbance from exploration, is of shorter duration. While certain types of damages are readily visible, others, such as changes in groundwater hydrology or habitat conditions, are more difficult to quantify or to link solely to oil and gas activities. Over the years, new environmental laws and industry practice and technology have reduced, but not eliminated, some of the most detrimental effects of oil and gas activities. In addition, oil and gas operators have taken steps, in some cases voluntarily, to reverse damages resulting from oil and gas activities, but

operators have not consistently taken such steps and the adequacy of these steps is not known. The Fish and Wildlife Service does not have a complete and accurate record of spills and other damage resulting from refuge-based oil and gas activities, has conducted few studies to quantify the extent of damage, and, therefore, does not know its full extent or the steps needed to reverse it.

The Fish and Wildlife Service's management and oversight of oil and gas activities varies widely among refuges. Management control standards for federal agencies require federal agencies to identify risks to their assets, provide guidance to mitigate these risks, and monitor compliance.[2] For the Fish and Wildlife Service, effectively managing oil and gas activities on refuges would entail, at a minimum, identifying the extent of oil and gas activities and their attendant risks, developing procedures to minimize damages by issuing permits with conditions to protect refuge resources, and monitoring the activities with trained staff to ensure compliance and accountability. However, we found a wide variance in the extent to which these management practices occur. Some refuges identify oil and gas activities and the risks they pose to refuge resources, issue permits that direct operators to minimize the effect of their activities on the refuge, monitor oil and gas activities with trained personnel, and charge mitigation fees or pursue legal remedies if damage occurs. For example, two refuges in Louisiana collect mitigation fees from oil and gas operators that are then used to pay for monitoring operator compliance with permits and state and federal laws. In contrast, other refuges do not issue permits or collect fees, are not aware of the extent of oil and gas activities or the attendant risks to refuge resources, and provide little management and oversight.

There are two primary reasons for the variation in management of oil and gas activities. First, the Fish and Wildlife Service's legal authority to require oil and gas operators to obtain access permits with conditions to protect refuge resources varies considerably, depending upon the nature of the mineral rights. For reserved mineral rights—cases where the property owner retained the mineral rights when selling the land to the federal government—the Fish and Wildlife Service can require permits only if the property deed subjects the rights to such requirements. For outstanding mineral rights—cases where the mineral rights were separated from the surface lands before the government acquired the property—the Fish and

[2] U.S. General Accounting Office, *Standards for Internal Control in the Federal Government*, GAO/AIMD-00-2131 (Washington, D.C.: Nov. 1999).

Wildlife Service has not formally determined its position regarding its authority to require access permits. However, we believe, based on statutory language and court decisions, that the Fish and Wildlife Service has the authority to require owners of outstanding mineral rights to obtain permits. Second, refuge managers lack sufficient guidance, resources, and training to properly monitor oil and gas operators. Current Fish and Wildlife Service guidance regarding the management of oil and gas activities where there are private mineral rights is unclear, according to refuge staff. Refuge staff said they also lack sufficient resources to oversee oil and gas activities, which at some refuges are substantial. Only three refuges in the system have staff dedicated on a full-time basis to monitoring these activities, and some refuge staff cite a lack of time as a reason for limited oversight. Staff also cite a lack of training as limiting their capability to oversee oil and gas operators; the Fish and Wildlife Service has offered only one oil and gas related workshop in the last 10 years. In addition, on a related management issue, the Fish and Wildlife Service has not, in all cases, adequately examined new property for possible contamination from oil and gas activities prior to acquisition. While the Fish and Wildlife Service requires an assessment of all possible contamination, the guidance and oversight provided to regional and refuge personnel are inadequate to ensure that the requirements are met. We found that three of the Fish and Wildlife Service's seven regions acquire lands without fully investigating hazardous substances and environmental problems for which they may become liable. For example, one region acquired a former oil storage site that required extensive soil removal and disposal, costing the Fish and Wildlife Service and others $58,000.

We are recommending that the Secretary of the Interior direct the Director of the Fish and Wildlife Service to strengthen its management and oversight practices by (1) collecting and maintaining better data on oil and gas activities and their environmental effects, and ensuring that staff resources, funding, and training are sufficient and (2) clarifying acquisition regulations to ensure that the Fish and Wildlife Service does not acquire unknown liabilities in its future land acquisitions. We are also recommending that, to improve the framework for managing and overseeing oil and gas activities, the Secretary and the Director work with the Department of the Interior's Office of the Solicitor to (1) determine the Fish and Wildlife Service's existing authority over outstanding mineral rights and (2) seek from Congress, in coordination with appropriate Administration officials, including those within the Executive Office of the President, any necessary additional authority over such rights, and over reserved mineral rights, to ensure that a consistent and reasonable set

of regulatory and management controls are in place for all oil and gas activities occurring on national wildlife refuges. In light of the department's perceived limitations of its ability to request additional legislative authority, Congress may also wish to consider expanding the Fish and Wildlife Service's authority to enable it to consistently regulate the surface activities of private mineral owners on wildlife refuges.

The Department of the Interior's response to the draft report was mixed. The department agreed that it could improve its acquisition policy and guidance. The department was silent on our recommendations that it should collect and maintain better data on oil and gas activities and their effects and that it should ensure that staff are adequately trained to oversee oil and gas activities. We continue to believe these recommendations are warranted. The department did raise a concern in regards to two of our recommendations. First, the department questioned whether hiring additional dedicated staff would be the most cost-effective solution to improving oversight. In voicing its concern, however, the department apparently misinterpreted our recommendation for the FWS to determine what level of staffing is necessary to oversee these activities as a call to hire additional staff. If the department determines that there are more cost-effective means to ensure adequate staffing, such as the use of contractors or temporary staff, that would also satisfy this recommendation. Second, the department raised concerns about GAO's recommendation that it seek additional authority from Congress to regulate private mineral rights. The department indicated that doing so would violate the Recommendations Clause of the U.S. Constitution by infringing upon the role of the President to recommend legislative action to Congress. We disagree. As a practical matter, we expect that the department would coordinate legislative proposals with the Administration and we have clarified the recommendation accordingly. Moreover, as a legal issue, there is nothing in the Recommendations Clause that bars an executive branch department from recommending legislation to Congress. Given the department's opposition to this recommendation, we have also raised this matter to Congress for its consideration.

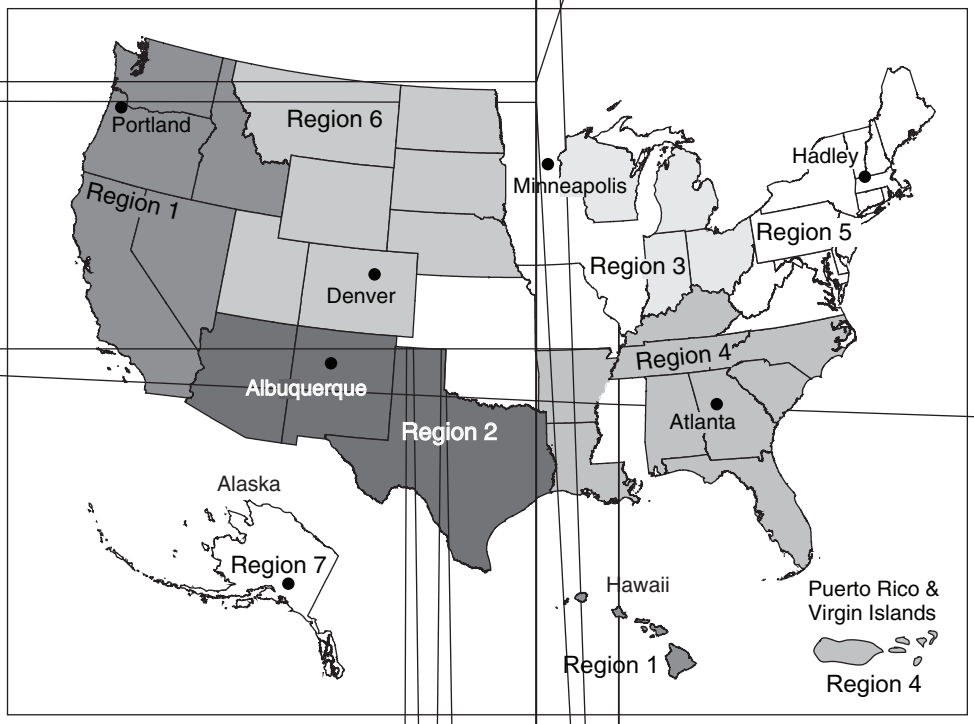
Background

The refuge system comprises 538 refuges, 37 wetland management districts (an administrative system of thousands of Waterfowl Production Areas and conservation easements, primarily in the north central United States), and 50 coordination areas.[3] The Fish and Wildlife Service (FWS) owns the surface lands and, in some cases, the mineral rights of National Wildlife Refuges and Waterfowl Production Areas, while conservation easements and coordination areas are owned or managed by others. Day-to-day management of wildlife refuges is the responsibility of local refuge managers, subject to the direction of seven regional refuge chiefs and the Chief of the National Wildlife Refuge System (see fig. 1 for a map of FWS regions). Of FWS's nearly $1.3 billion budget in fiscal year 2002, about $319 million was devoted to the operations and maintenance of the refuge system. In fiscal year 2002, $99.13 million from the Land and Water Conservation Fund was used for the acquisition of additional refuge lands.[4]

[3] Waterfowl Production Areas, which were incorporated into the refuge system in 1966, are lands acquired by the FWS using Federal Duck Stamp monies for the preservation of wetland and grassland areas critical to waterfowl and other wildlife. A majority of these lands are located in the prairie wetlands of the Dakotas, Minnesota, and Montana. Coordination areas are federal lands made available to a state by cooperative agreement between the FWS and the state fish and wildlife agency.

[4] The Land and Water Conservation Fund is authorized for, among other things, acquisition of land and waters for diverse purposes under several different laws. This includes conservation of endangered or threatened species under the Endangered Species Act, as well as the acquisition of any areas authorized for the refuge system by specific statutes. 16 U.S.C. § 4061.

Figure 1: Fish and Wildlife Service Regions



Source: GAO.

Over the years, we and others have examined the effects on the refuge system of secondary activities,[5] such as recreation, military activities, and oil and gas activities—which include oil and gas exploration, drilling and production, and transport. Exploring for oil and gas involves seismic mapping of the subsurface topography. Seismic mapping, regardless of the technology employed, requires surface disturbance, often involving small dynamite charges placed in a series of holes, typically in patterned grids. If seismic mapping reveals potential oil or gas deposits exploratory drilling begins. Oil and gas drilling and production often requires constructing, operating, and maintaining industrial infrastructure, including a network of access roads and canals, local pipelines to connect well sites to production

[5] U.S. General Accounting Office, *National Wildlife Refuges: Continuing Problems with Incompatible Uses Calls for Bold Action*, GAO/RCED-89-196 (Washington, D.C.: Sept. 8, 1989).

facilities and dispose of drilling wastes, and gravel pads to house the drilling and other equipment. In addition, production may require storage tanks, separating facilities, and gas compressors. Finally, transporting oil and gas to production facilities or to users requires transit pipelines. Typically buried, these pipelines range in size, with some as large as 30 inches in diameter. Pumping stations and storage tanks may also be needed for pipeline operations.

Under the National Wildlife Refuge System Administration Act of 1966, as amended, FWS is responsible for regulating all activities on refuges. The act requires FWS to determine the compatibility of activities with the purposes of the particular refuge and the mission of the refuge system and not allow those activities deemed incompatible.[6] However, FWS does not apply the compatibility requirement to the exercise of private mineral rights on refuges. Department of the Interior regulations also prohibit leasing federal minerals underlying refuges outside of Alaska, except in cases where federal minerals are being drained by operations on property adjacent to the refuge.

Nevertheless, the activities of private mineral owners on refuges are subject to a variety of legal restrictions, including FWS regulations. A variety of federal laws affect how private mineral rights owners conduct their activities.[7] For example, the Endangered Species Act of 1973 prohibits the "take" of any endangered or threatened species and provides for penalties for violations of the act;[8] the Migratory Bird Treaty Act prohibits killing, hunting, possessing, or selling migratory birds, except in accordance with a permit;[9] and the Clean Water Act prohibits discharging oil or other toxic substances into waters of the United States and imposes liability for removal costs and damages resulting from a discharge.[10]

[6] 16 U.S.C. §§ 668dd(a), (d).

[7] State laws also may affect the conduct of oil and gas activities.

[8] 16 U.S.C. §§ 1538, 1540. The term "take" means to harass, harm, pursue, hunt, shoot, wound, kills, trap, capture, or collect. 16 U.S.C. § 1532 (19).

[9] 16 U.S.C. § 703.

[10] 33 U.S.C. § 1321(b).

Also, FWS regulations require that oil and gas activities be performed in a way that minimizes the risk of damage to the land and wildlife and the disturbance to the operation of the refuge. The regulations also require that land affected be reclaimed after operations have ceased.[11] Whether FWS has authority to impose permitting requirements on private oil and gas activities is discussed later in this report.

Extent of Oil and Gas Activities in Refuges

At least 155 of the 575 refuges of the National Wildlife Refuge System have some past or present oil and gas activities—exploration, drilling and production, or transit pipelines. Many of these activities are concentrated around the Gulf Coast of Louisiana and Texas. We found that oil and gas exploration has occurred at 44 refuges since 1994. We also determined that there are 4,406 wells on 105 refuges, though only 41 percent of the wells at 36 refuges are active, with the other wells either plugged and abandoned or temporarily idle. Active wells on refuge lands produce roughly 1.1 percent and 0.4 percent of domestically produced oil and gas from onshore wells, with an approximate value of $880 million based on 2001 prices. In addition, active oil and gas transmission pipelines cross at least 107 refuges. Bordering refuges, another 4,795 wells reside within one-half mile outside refuge boundaries, in some cases on lands that FWS may acquire in the future.

One-Quarter of All Refuges Have Past or Present Oil and Gas Activities

About one-quarter, or 155, of the 575 refuges (538 refuges and 37 wetland management districts) that constitute the National Wildlife Refuge System have past or present oil and gas activities—exploration, drilling and production, transit pipelines, or some combination of these (see table 1).[12] Since 1994, FWS records show that 44 refuges have had some type of oil and gas exploration activities—geologic study, survey, or seismic work. More than one-half of these exploratory activities occurred in the southeastern and southwestern regions of the United States. We also identified 105 refuges with inactive or active oil and gas wells and 107 refuges with transit pipelines. Exploration or drilling and production activities occurred at 120 of the 155 refuges.

[11] 50 C.F.R § 29.32.

[12] This analysis does not include coordination areas, which are managed by states, or conservation easements, which are not owned by FWS.

Table 1: Number of Refuges with Oil and Gas Activities, by FWS Region

	Number of refuges, by category			Unduplicated counts, by category group	
FWS region[a]	Exploration (survey and seismic work)[b]	Drilling and production (active and inactive oil and gas wells)[c]	Active pipelines (transiting refuge lands)[d]	Exploration and/or drilling and production	Exploration, drilling and production, and/or pipelines
1 (Pacific)	5	20	9	22	24
2 (Southwest)	10	22	24	22	29
3 (Great Lakes-Big Rivers)	1	10	14	10	19
4 (Southeast)	14	28	37	34	45
5 (Northeast)	1	4	6	4	6
6 (Mountain-Prairie)	9	20	15	24	27
7 (Alaska)	4	1	2	4	5
Total	**44**	**105**	**107**	**120**	**155**

Sources: FWS, Premier Data Services, and Office of Pipeline Safety.

[a]See figure 1.

[b]Based on GAO's analysis of refuge reported data to FWS's Refuge Management Information System, 1994-2001.

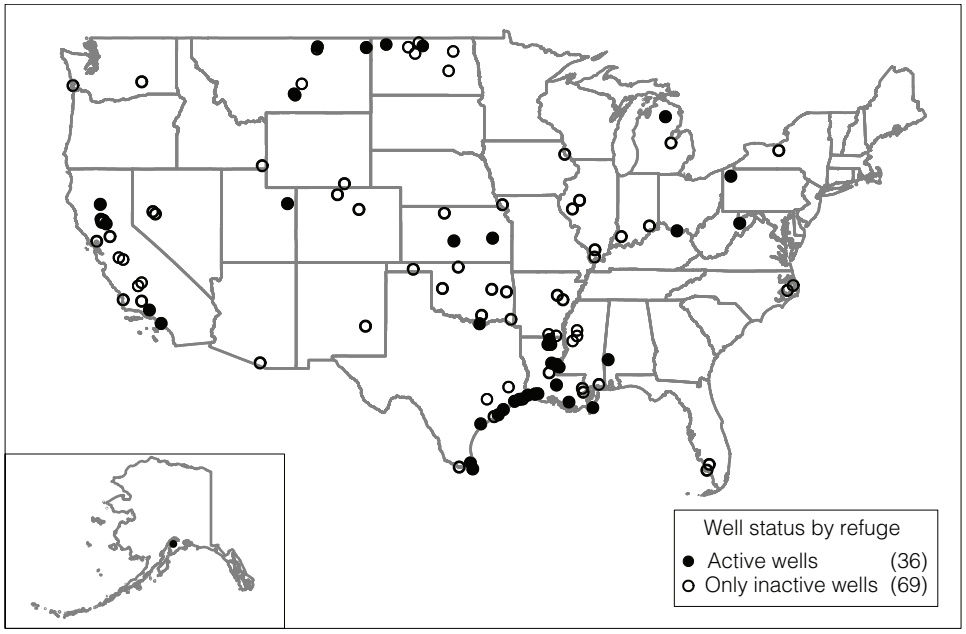
[c]Based on GAO's analysis of Premier Data Services' nationwide well database, January 2003.

[d]Based on GAO's analysis of the National Pipeline Mapping System and Refuge Management Information System data, 1994-2001.

Wells in the Refuge System Are Geographically Concentrated

In total, we identified 4,406 oil and gas wells within 105 refuges. The number of wells per refuge ranged from 1 dry hole well drilled at Willapa Bay National Wildlife Refuge (NWR) in Washington to 1,120 wells at Upper Ouachita NWR in Louisiana. Although refuges with oil and gas wells are present in every FWS region, they are more heavily concentrated in the Gulf Coast of the United States (see fig. 2). More than one-half of the wells (2,512) are located on refuges in FWS Region 4 and a majority of these are in Louisiana.

Figure 2: National Wildlife Refuges with Oil and Gas Wells



Source: Premier Data Services (data) and GAO (analysis).

Wells are also concentrated among a minority of the system's units. For example, five refuges contain 57 percent of all the wells in the system, as shown in table 2.

Table 2: Refuges with the Highest Number of Wells

Refuge	FWS region	State	Number of wells
Upper Ouachita NWR	4	La.	1,120
St. Catherine's Creek NWR	4	Miss.	465
Deep Fork NWR	2	Okla.	362
Delta NWR	4	La.	338
Lower Rio Grande Valley NWR	2	Tex.	217
Total			**2,502**

Sources: Premier Data Services (data); GAO (analysis).

A Minority of Wells in Refuges Are Actively Producing, Yielding About 1 Percent of the U.S.'s Total Onshore Production

About 4 out of 10 wells located on refuges are actively producing. Of the 4,406 wells, 1,806, or 41 percent, were known to be actively producing oil or gas or disposing of produced water as of the most recent reporting time period as of January 2003. Of the 105 refuges with oil and gas wells, 36 refuges have actively producing wells. The remaining 2,600 wells did not produce oil, gas, or water during the last 12 months; many of these were plugged and abandoned or were dry holes.[13] Gas wells were the most common type of well as indicated in table 3.

Table 3: Types of Oil- and Gas-Related Wells Located on National Wildlife Refuges

Type of well	Total
Gas	1,265
Dry hole	967
Unknown[a]	677
Plugged and abandoned	642
Oil	618
Injection or disposal	99
Oil and gas	65
Active permit	34
Miscellaneous[b]	23
Temporarily abandoned	10
Coalbed methane	6
Total	**4,406**

Sources: Premier Data Services (data); GAO (analysis).

[a]Permittees had not yet updated the status of these wells to their respective state oil and gas commissions

[b]Includes service, test, recovery, and water wells.

[13] Wells that are plugged and abandoned are permanently sealed by cementing the well bore. Improperly plugged wells can intrude on fresh water supplies or cause fires and seepage.

Active wells on refuge lands produced a total of 23.7 million barrels of oil and 88,171 million cubic feet of natural gas during the most recent 12 months as of January 2003—about 1.1 percent of the 2.117 billion barrels of oil and 0.4 percent of the 24,532,514 million cubic feet of natural gas produced during 2001 (see table 4).[14] The 1,806 active oil and gas wells on refuge lands were roughly 1 percent of the approximately 148,750 active onshore oil and gas wells in the United States in 2001.[15] The value of all refuge-based production, based on 2001 average prices, was over $880 million. However, in addition to levels of production and oil and gas prices, the net benefit of oil and gas activities depends on a number of factors, including size of the investment in infrastructures and any adverse effects on the environment, recreation, and tourism.[16]

Table 4: Oil and Gas Production from Refuge System Wells, January 2003

	Refuge-based production (last 12 months)	Domestic onshore production (2001)	Refuge-based production (percent of total)	Wellhead price (2001)	Value of production
Oil production (barrels)	23,694,548	2,117,512,000	1.1	$21.84 (per barrel)	$517,488,928
Natural gas production (million cubic feet)	88,171	24,532,514	0.4	$4.12 (per thousand cubic feet)	$363,264,520
Total					**$880,753,448**

Sources: Premier Data Services and Energy Information Administration (data); GAO (analysis).

[14] All production data are based on information reported to each state oil and gas commission by oil and gas operators. This information is updated on different cycles in each state. The totals reported reflect the most recent data as of January 2003.

[15] The total number of wells is based on the Energy Information Administration's Financial Reporting System for 33 major energy-producing companies based in the United States.

[16] The exact economic impact of oil and gas activities in wildlife refuges has never been estimated, according to FWS officials. Determination of such an impact is extremely difficult due to a number of factors. Because many of these refuges have had oil and gas activities for many decades, the effect that these older operations may have had on the local economy, including the possible adverse impacts on recreation or tourism industries, would be impossible to measure.

Transit Pipelines Cross Refuges

At least 273 miles of transit pipeline from 49 different oil and gas pipelines cross 28 of the 138 refuges for which data are available.[17] These pipelines are almost exclusively buried and generally require right-of-way permits from FWS. The pipelines vary in size, up to 30 inches in diameter and carry a variety of products, including crude oil, refined petroleum products, and high-pressure natural gas (see table 5). While pipelines cannot be constructed across refuge lands unless FWS determines that the pipelines are compatible with the purposes of the refuge and issues a right-of-way permit, some pipelines were constructed before FWS acquired the property. These pipelines did not undergo a compatibility determination and may not have received a right-of-way permit.

Table 5: Refuges with Oil and Gas Pipelines Crossing Refuge Lands

	Number of refuges	Number of pipelines	Miles of pipeline
Liquids pipelines[a]	19	24	146.3
Natural gas pipelines[b]	5	7	24.2
Both liquid and gas	4	18	102.4
Total	**28**	**49**	**273**

Sources: National Pipeline Mapping System and Department of Transportation (data); GAO (analysis based on 138 of the 575 refuges).

[a]Category includes crude oil, liquid petroleum gas, natural gas liquids, and other petroleum products.

[b]Category includes natural gas, highly volatile natural gas, and carbon dioxide.

[17] Additional pipelines cross some of the 437 refuges for which digital boundary data are not available and were not analyzed by us. For example, 79 additional refuges for which we did not have digital boundary data reported to the Refuge Management Information System that at least 1 transit pipeline crossed their refuges. These figures also do not include smaller pipelines that are used for gathering production from wells (called flow- or gathering lines).

Transit pipelines may also have associated storage facilities and pumping stations, such as those we toured at Delta NWR in Louisiana (see fig. 3), but data are not available to identify how many of these are on refuges.

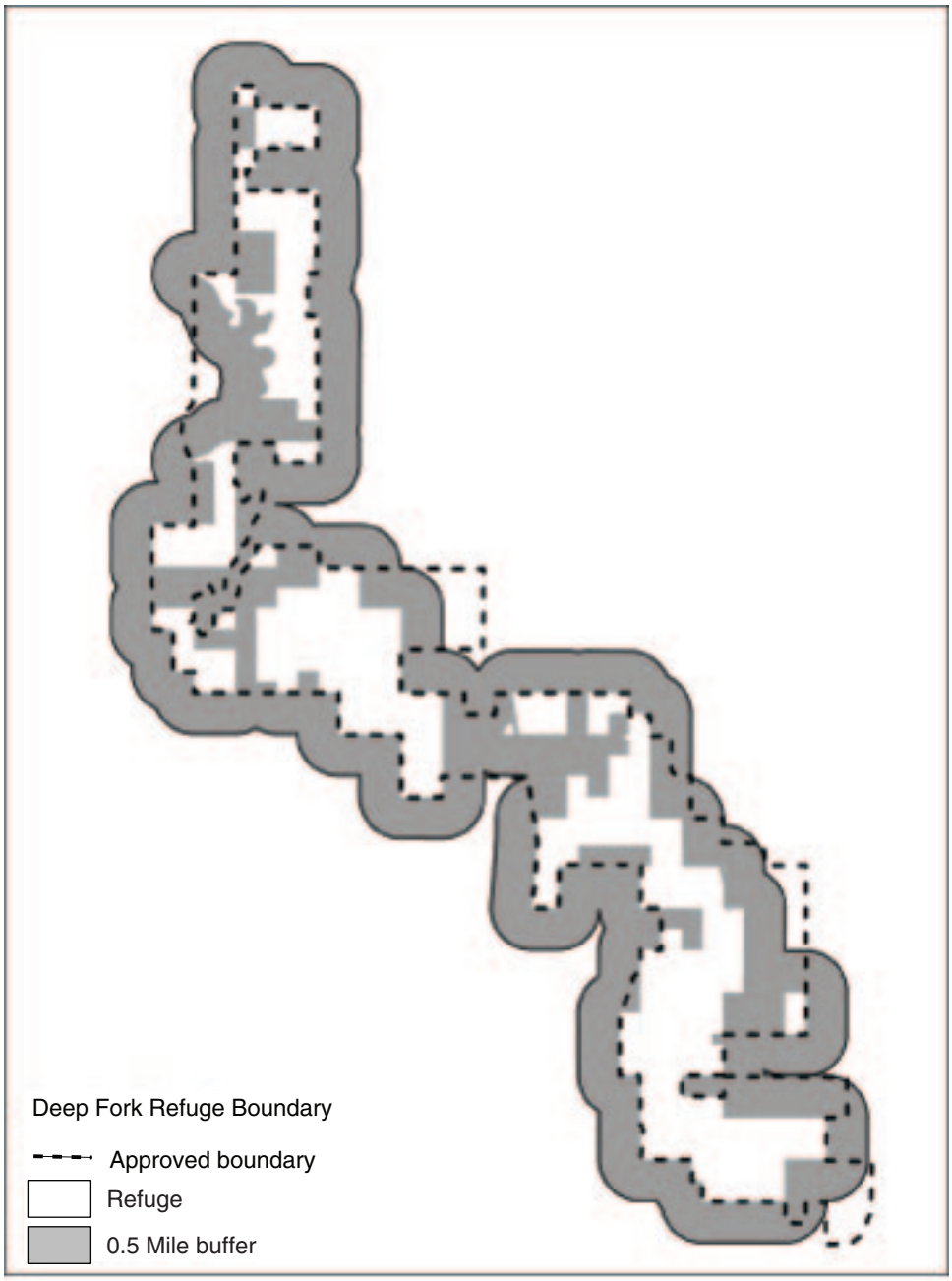
Figure 3: Pipeline Storage and Loading Facilities, Delta NWR (La.)

Source: GAO.

Additional Wells and Pipelines Are Located within One-Half Mile of Refuge Boundaries

A total of 4,795 wells and 84 transit pipelines reside just outside refuges, within one-half mile of refuge boundaries. The 4,795 wells bound 123 refuges, 33 of which do not have any resident oil and gas wells. The 84 pipelines are 186 miles long and border 42 different refuges. While FWS does not own the land outside refuge boundaries, lands surrounding refuges may be designated for future acquisition. For example, at Deep Fork NWR in Oklahoma, 606 wells are within one-half mile outside current boundaries, and some of this land is within approved boundaries for future acquisition (see fig. 4).

Figure 4: Deep Fork NWR (Okla.) Current and Approved Acquisition Boundaries



Source: FWS and GAO.

Overall Effects of Oil and Gas Activities Are Unknown, but Those Activities Have Diminished Some Refuge System Resources

The overall environmental effects of oil and gas activities on refuge resources are unknown because FWS has conducted few cumulative assessments and has no comprehensive data. Available information indicates that refuge wildlife and habitat have been harmed to varying degrees by spills of oil, gas, brine,[18] and industrial materials as well as through the construction, operation, and maintenance of the infrastructure necessary to produce oil and gas. Routine oil and gas activities can contaminate a refuge and reduce the quantity and quality of habitat available for wildlife. Over the years, new environmental laws and improved industry practices and technology have reduced some of the most detrimental effects of oil and gas activities; however, some harm to refuges continues to occur and some effects from earlier events have not been reversed and continue to diminish refuge resources. In addition, oil and gas operators have taken steps, in some cases voluntarily, to reverse damages resulting from oil and gas activities, but operators have not consistently taken such steps and the adequacy of these steps is not known. FWS does not have an accurate record of the number of spills on refuges and has conducted few studies on the effects of refuge-based oil and gas activities and, therefore, does not know the full extent of the problem or the steps needed to reverse them.

Oil and Gas Activities Have, to Varying Degrees, Diminished Refuge System Resources

Available studies, anecdotal information, and our observations show that some refuge resources have been diminished to varying degrees by spills of oil, gas, and brine and through the construction, operation, and maintenance of the infrastructure necessary to extract oil and gas. The damage varies widely in severity, duration, and visibility, ranging from infrequent small oil spills and industrial debris with no known effect on wildlife, to large and chronic spills causing wildlife deaths and long-term soil and water contamination. Some damage, such as habitat loss because of infrastructure development and soil and water contamination, may last indefinitely while other damage, such as wildlife disturbance during seismic mapping, is of shorter duration. Also, while certain types of damage are readily visible, others, such as groundwater contamination and reduced habitat quality from infrastructure development, are difficult to observe, quantify, and associate directly with oil and gas activities. Finally, oil and gas activities may hinder FWS's ability to manage or improve refuge

[18] Brine is water mixed with salts, other minerals, and oil.

habitat, such as seasonal flooding of wetlands or prescribed burns, or hinder public access to parts of the refuge.

Spills

Spills of oil, gas, and brine have harmed refuge wildlife and habitat. Oil and gas can injure or kill wildlife by destroying the insulating capacity of feathers and fur, depleting oxygen available in water, or exposing wildlife to toxic substances. Long-term effects of oil and gas contamination are difficult to determine, but studies suggest that effects of exposure include reduced fertility, kidney and liver damage, immune suppression, and cancer. Even small spills may contaminate soil and sediments if they occur frequently. For instance, a study of Atchafalaya and Delta NWRs in Louisiana found that levels of oil contamination near oil and gas facilities are lethal to most species of wildlife, even though refuge staff were not aware of any large spills.[19] Figure 5 shows an ongoing clean up of a relatively small oil spill that occurred at Delta NWR in 2002. Brine spills can also be lethal to young waterfowl, damage birds' feathers, kill vegetation, and decrease nutrients in water. Based on well data from Premier Data Services, over 19.8 million gallons of brine were produced from active wells on NWRs during the most recent 12-month reporting period as of January 2003. Much of this brine was reinjected back into the ground to prevent surface damage.

[19] North Carolina State University, Department of Environmental and Molecular Toxicology, *Chemical Contamination at National Wildlife Refuges in the Lower Mississippi River Ecosystem*, February 2001, for the U.S. Department of the Interior.

Figure 5: Ongoing Cleanup of Oil Spill at Delta NWR (La.)

Source: GAO.

Note: Absorbent pads and booms in foreground.

The 16 refuges we visited reported oil, gas, or brine spills, although the frequency and effect of the spills varied widely. For instance, Hopper Mountain NWR in California reported two oil spills in 1990, the only spills since 1974, and refuge records indicated that the operator cleaned up each spill quickly and that refuge staff detected no effect on wildlife. In contrast, Anahuac NWR in Texas reported at least 7 oil spills since 1991, including 1 pipeline spill that killed over 800 large fish such as mullet and redfish and over 180,000 menhaden, a small but ecologically important fish. FWS officials said that natural gas leaks generally pose a lower risk to habitat than oil spills, but a gas leak in 2000 at Sabine NWR in Louisiana killed fish, crabs, and amphibians. Brine spills have also damaged refuges. For example, Atchafalaya and D'Arbonne NWRs in Louisiana reported that brine spills had killed vegetation in the area of the spill. At these refuges, salt concentrations in the soil have remained high and continued to spread

for decades after a spill, and some sites do not support vegetation years afterwards.

The exact number and size of oil and gas spills on NWRs is not known. Nationally, FWS reported that 348 oil and gas spills were located on or near refuges during fiscal year 2002, although there are limitations to this figure. First, it includes spills resulting from activities not associated with oil and gas production or transit pipelines, such as shipping accidents. Second, FWS calculated the number of spills by reviewing spill reports from the National Response Center and other parties that did not always identify if a refuge is affected. Third, not all spills are required to be reported. Clean Water Act regulations require operators to report spills of any quantity if they cause a sheen to form on waters subject to federal jurisdiction.[20] Other spills are subject to state reporting requirements, which vary. For instance, Texas requires operators to report spills over 210 gallons, while Louisiana requires operators to report spills over 42 gallons. Finally, refuge staff told us that they knew of spills that operators never reported.

Infrastructure

Constructing, operating, and maintaining the infrastructure necessary to produce oil and gas can harm wildlife by reducing the quantity and quality of habitat. At Kenai NWR in Alaska, for instance, oil and gas wells and associated facilities have eliminated at least 524 acres of habitat, while other infrastructure, such as access roads and pipelines, has eliminated an additional 424 acres. While this loss of habitat represents a very small proportion of total refuge acreage, refuge staff determined that it eliminated food sources that would have supported between 41 and 136 cow moose and 411 snowshoe hares. In other instances, habitat lost to infrastructure development is negligible—for example, the presence of a wellhead or pipelines, such as the wellhead at Delta NWR shown in figure 6.

[20] 40 C.F.R. § 110.3(b).

Figure 6: Wellhead at Delta NWR (La.)

Source: GAO.

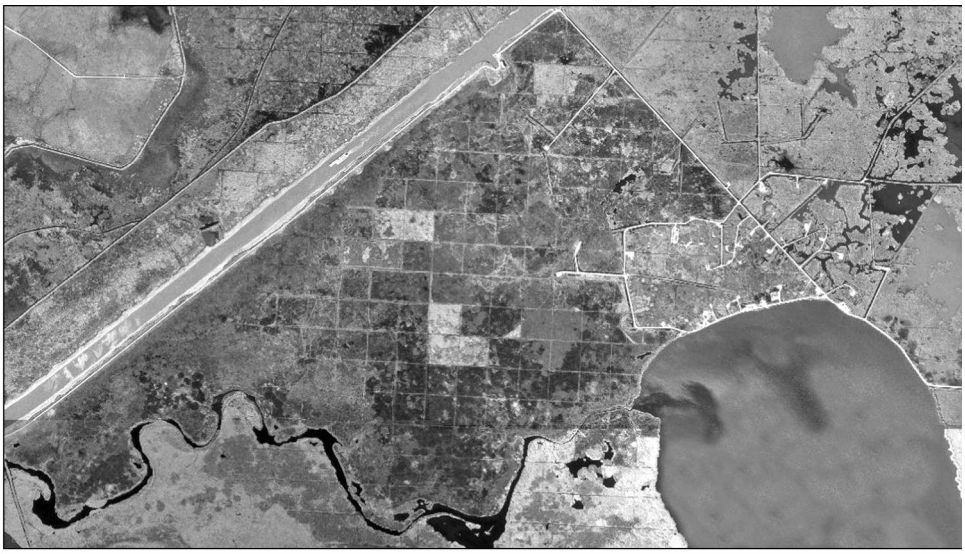
Infrastructure development can reduce the quality of habitat by fragmenting it and, in some cases, by changing the hydrology of the refuge ecosystem or contaminating it with toxic substances. Habitat fragmentation occurs when a network of roads, canals, and other infrastructure is constructed in previously undeveloped areas of a refuge. Fragmentation increases disturbances from human activities, provides pathways for predators, and helps spread nonnative plant species. For example, the endangered California condor is particularly susceptible to disturbances from human activities. Condors have been observed landing on oil pads on the refuge, which poses a safety risk to the birds and reduces their fear of humans. In addition, FWS estimated in 1980 that oil and gas activities at Hopper Mountain NWR eliminated about 63 percent of the potential feeding habitat for condors on the refuge. The current refuge manager said that the effect of this loss on the condor population may not be significant because the importance of the feeding habitat provided by the refuge may not be as great as previously thought. Corridors that oil and gas operators have developed assist predation—for example, among songbirds, and allow a pathway for invasive species, a significant management problem for FWS.[21] Finally, officials at Anahuac and McFaddin NWRs in Texas said that disturbances from oil and gas activities are likely significant and expressed concern that bird nesting may be

[21] U.S. General Accounting Office, *Invasive Species: Clearer Focus and Greater Commitment Needed to Effectively Manage the Problem*, GAO-03-1 (Washington, D.C.: Oct. 22, 2002).

disrupted. However, no studies have been conducted at these refuges to determine the effect of these disturbances.

Infrastructure networks can also damage refuge habitat by changing the hydrology of the refuge ecosystem, particularly in coastal areas. For instance, tens of thousands of acres of freshwater marsh at Sabine NWR, and elsewhere in Louisiana and Texas, have been lost due to saltwater intrusion. Saltwater intrusion may change the types of plants in the marsh and can cause erosion that creates an open water habitat that is less biologically productive than the marsh. While several factors contribute to the saltwater intrusion, construction of canals to access oil and gas facilities is considered by many scientists to be significant. Seismic studies for oil and gas exploration in coastal marshes can also contribute to saltwater intrusion. Seismic studies are typically conducted in a grid pattern and may cover large portions of a refuge. Preparing and conducting seismic studies may require heavy equipment that can compress the marsh, which changes the plant community and could allow saltwater to intrude into the marsh, particularly during droughts that decrease freshwater flows. At McFaddin NWR, the grid pattern from a 1995 seismic study was clearly visible from infrared aerial photographs taken after the seismic study was completed (see fig. 7).

Figure 7: Compressed Marsh Grid from 3-D Seismic Study at McFaddin NWR (Tex.)



Source: FWS.

Note: Infrared photograph (1995).

Moreover, industrial activities associated with extracting oil and gas have been found to contaminate wildlife refuges with toxic substances such as mercury and polychlorinated biphenyls (PCB). D'Arbonne, Kenai, and Upper Ouachita (Louisiana) NWRs reported mercury contamination, and Kenai NWR reported PCB contamination from oil and gas activities that must still be cleaned up by FWS if the responsible parties cannot be found. Mercury and PCBs were used in equipment such as compressors, transformers, and well production meters, although generally they are no longer used. Mercury has been linked to brain, kidney, and reproductive system damage, and PCBs are known animal carcinogens.

Legal and Industry Changes Have Reduced Some of the Environmental Effects of Oil and Gas Activities

New laws prohibiting some of the most harmful industry practices have helped diminish the adverse effect of current and recent oil and gas activities on refuge resources. For example, Louisiana now generally prohibits using open pits to store production wastes and brine in coastal areas or discharging brine into drainages or state waters. Another example is Texas, which requires operators to install screens or nets over open tanks and pits to protect birds from contacting hazardous fluids. Texas also now requires operators to remove oil and gas infrastructure, such as tanks,

which will not be actively used in the continuing operation of a lease and to contour closed sites to reduce water contamination.

Improvements in industry practice, including improved technology, have also reduced the damage caused by oil and gas activities. For example, where feasible, directional drilling allows (1) operators to avoid placing wells in sensitive areas such as wetlands and (2) several wells to be drilled from the same pad, thus reducing the amount of habitat damaged. Another example is improved geologic mapping through 3-D seismic technology. While 3-D seismic studies require more vehicle traffic and may damage more vegetation than 2-D studies, improved geologic mapping may reduce the number of wells drilled that do not produce oil or gas and ultimately reduce the amount of habitat damaged. Furthermore, the impact of 3-D seismic studies has been reduced through other improvements, including using vehicles less damaging to the surface, reducing the number of vehicle trips necessary, hand carrying seismic lines to avoid vehicle damage altogether, and scheduling seismic operations to avoid sensitive times.

While the relative impacts of the activities have been reduced in recent years, the effects have not been eliminated. For instance, oil and gas infrastructure continues to diminish availability of refuge habitat for wildlife, and spills of oil, gas, and brine that damage fish and wildlife continue to occur. In addition, several refuge managers reported that operators do not always comply with legal requirements or follow best industry practices such as constructing berms (earthen barriers) around tanks to contain spills, covering tanks to protect wildlife, and removing pits that temporarily store fluids used during well maintenance.

Reversing Environmental Damages Is Inconsistent

Environmental damage from oil and gas activities may be partially reversed by remediating contamination or by reclaiming a site to its prior condition after oil and gas activities cease. However, oil and gas operators have not consistently taken steps to reverse environmental damages that have occurred from oil and gas activities on NWRs. In some cases, officials do not know if remediation following spills is sufficient to protect refuge resources, particularly for smaller oil spills or spills into wetlands. In other cases, FWS has been satisfied with the response. According to refuge officials and industry representatives, when small oil spills occur, operators may contain the oil and then remove the oil and the contaminated soil, but in some cases operators leave the oil and cover it with dirt. In contrast, the effects of larger spills may be evaluated systematically and remediated by

the operator. For example, in 2000, a ruptured pipeline spilled nearly 200,000 gallons of crude oil at John Heinz NWR in Pennsylvania, damaging several species of wildlife and covering a frozen pond. In response, the operator removed the oil and the contaminated soil, replanted damaged vegetation, funded scientific studies to determine the effect on refuge wildlife, compensated the refuge for the value lost to visitors during the spill; and the operator is negotiating with FWS to identify an appropriate restoration project to compensate for the ecologic value of refuge resources lost while the refuge recovers from the spill.

Similar to spill remediation, reclamation of oil and gas facilities following their use is also inconsistent. For instance, an operator at McFaddin NWR removed a road and a well pad that had been constructed to access a new well site and restored the marsh damaged by construction after the well was no longer needed. Figure 8 provides an aerial view of the road and the well pad shortly after they were constructed and a photo of the same site following reclamation. Other refuges, however, reported that storage tanks, debris, and access roads remained long after use (see fig. 9). Refuge staff cited several reasons for some sites not being reclaimed, including difficulty identifying the responsible parties, operator insolvency, potential future use because other locations in the same field remained in operation, and uncertainty of their authority to require operators to reclaim sites. Finally, several states do not require operators to reverse the effects of oil and gas activities.[22] For instance, Texas law does not require operators to remove all buried flowlines or access roads. Several states, such as Oklahoma and Texas, have established programs to clean up abandoned oil and gas sites, but funds are limited.

[22] For a comparison of state reclamation requirements, see U.S. General Accounting Office, *Alaska's North Slope: Requirements for Restoring Lands after Oil Production Ceases*, GAO-02-357 (Washington, D.C.: June 5, 2002).

Figure 8: Site Restoration at McFaddin NWR (Tex.)

Sources: FWS (above); GAO (below).

Note: Location of well site before (1996) and after restoration (2002).

Figure 9: Examples of Unreclaimed Infrastructure on NWRs

Sources: GAO (above); GAO (below).

Notes:

Exposed and abandoned flowlines at Anahuac NWR (Tex.) (above).

Abandoned tank battery at Deep Fork NWR (Okla.) (below).

Because operators do not consistently or entirely reverse environmental damages resulting from oil and gas activities, FWS has had to clean up sites at its expense or leave sites unreclaimed. FWS spent $387,100 to clean up 14 oil- or gas-related sites between fiscal years 1991 and 2002 and is planning to spend an additional $108,000 at 3 sites in fiscal year 2003. These cleanup projects included removing oil- and gas-related debris, plugging unused gas wells, and addressing mercury contamination at 9 refuges in Arkansas and Louisiana. Other sites remain to be addressed. There are 2,600 inactive wells on refuges, including an unknown number that have been abandoned but not plugged, and some sites also have unused tanks, flowlines, and debris that should be removed. The estimated cost of cleanup at a site at Anahuac NWR is $1.1 million and currently is deferred until fiscal year 2009. Refuge managers at some refuges we visited expressed concern that as oil and gas production declines, operators will abandon more infrastructure and FWS will have to reclaim these sites.

FWS Documentation of Environmental Effects Is Limited and Inconsistent

FWS has conducted few studies to quantify the extent of the damage caused by oil and gas activities. FWS identifies and assesses contaminant threats to refuges by conducting Contaminant Assessment Process (CAP) studies and other studies of contamination. Although CAP studies are FWS's primary formal mechanism for identifying potential sources of contaminants on refuges, the studies do not quantify the extent of any contamination or its biological effects. Moreover, CAP studies have not been conducted at all refuges with oil and gas activities, including many refuges that have significant activities. FWS established the CAP process in 1996, and to date studies have been completed at about 193 refuges (about 34 percent of all refuges), including 67 of the 155 refuges (43 percent) with oil and gas activities. The number of refuges with oil and gas activities that have completed CAP studies varies by region. For instance, in Region 2, which includes Texas, 20 of 28 refuges (71 percent) had completed CAP studies, while in Region 4, which includes Louisiana, 11 of 45 (24 percent) had completed CAP studies. The national coordinator for CAP said that the studies are sequenced to coincide with each refuge's comprehensive conservation planning process, which, in turn, is prioritized within each region based on factors including primary threats, staffing levels, and funding. Finally, the comprehensiveness of the studies varies widely. The CAP for Kenai NWR lists over 330 known spills and describes other potential contamination sources from oil and gas activities. In contrast, the CAP study for Deep Fork NWR did not list oil and gas activities as a potential source of contamination, even though there are over 360 wells on the refuge and the refuge's comprehensive conservation

plan previously identified concerns over oil and gas activities, including unplugged wells. The CAP program manager stated that, in this case, FWS staff did not follow the procedures established in the CAP manual, which requires that all potential sources of contamination be identified.

If contaminants are identified at a refuge, FWS may conduct additional studies through its contaminants program. Since 1988, FWS has funded at least 33 studies at 47 national wildlife refuges nationwide that have examined the effects of oil and gas activities.[23] The scope of the studies ranged from general investigations to document the presence and concentration of a variety of contaminants, including those associated with oil and gas activities, to specific studies to examine the impact of oil and gas activities on particular refuges. In some cases, contamination concerns identified in a general investigation may lead to a more detailed study. For instance, a contaminants survey at Hagerman NWR identified contaminants from oil and gas activities, but the survey was insufficient to determine the effects on fish and wildlife. A later study determined that brine and oil contaminant levels did not appear to be of concern.

In addition to conducting its own studies, FWS uses studies conducted by other government agencies and universities, in some cases at its request. For instance, the U.S. Geological Survey is studying the effects of a 3-D seismic study at Sabine NWR to determine the long-term effects of seismic activities on refuge plant species, and Drexel University is studying the impact of an oil spill on wildlife at John Heinz NWR, including any effects on a rare turtle species.

The lack of information on the effects of oil and gas activities on refuge wildlife hinders FWS's ability to identify and obtain appropriate mitigation measures and to require responsible parties to address damages from past activities. For instance, the Chief, Division of Environmental Quality, stated that FWS does not always know the effects of oil and gas activities on wildlife or habitat and, therefore, does not know what actions should be required of operators to reduce those effects. Lack of sufficient information has also hindered FWS's efforts to identify all locations with past oil and gas activities and to require responsible parties to address damages. FWS does not know the number or location of all

[23] Some of the 33 studies examined the effects of oil and gas contamination resulting from activities that are outside the scope of GAO's study, such as activities occurring outside of the refuge.

abandoned wells and other oil and gas infrastructure or the threat of contamination they pose and, therefore, its ability to require responsible parties to address damages is limited. While recognizing the value of this type of information, the Chief, Division of Environmental Quality, said that in some cases FWS lacked the budget to fund environmental studies and that, in other cases, the cost of obtaining the information was disproportionate to its management value. In those cases where FWS has performed studies, the information has proved valuable. For example, FWS funded a study at some refuges in Oklahoma and Texas to inventory locations containing oil and gas infrastructure, to determine if they were closed legally, and to document their present condition. FWS intends to use this information to identify cleanup options with state and federal regulators. If this effort is successful, FWS may conduct similar studies on other refuges. In other cases, refuges have requested studies that have not been funded. For instance, proposals to examine the effects of oil and gas activities on a wetland management district in Montana and to identify unknown oil and gas locations at Kenai NWR have not been approved, in part, due to lack of funds. In the case of Kenai NWR, refuge staff said that current operators may be responsible for cleaning up historic sites but that FWS had to identify the sites before it could make this determination.

FWS Management and Oversight of Oil and Gas Activities Varies Widely

FWS's management and oversight of oil and gas activities varies widely from refuge to refuge. Effectively managing these activities across the refuge system would entail, at a minimum, identifying the risks posed by the activities, establishing operating conditions to minimize damages, and monitoring the activities with trained staff to ensure compliance. While some refuges have adopted comprehensive management and oversight practices, others have done little. Variation in refuges' management and oversight of oil and gas activities stems from differences in FWS's regulatory authority depending upon the nature of the mineral rights and from inadequate guidance, resources, and training for refuge staff. In addition, on a related management issue, FWS's policy requiring a complete and thorough assessment of potentially contaminated property prior to acquisition is not always adhered to because of inconsistent interpretation of the requirements by FWS, placing the federal government at risk of assuming unknown cleanup costs in the future.

Management and Oversight Varies Among Refuges

FWS's objective in managing oil and gas on refuge lands is to protect wildlife habitat and other resources while allowing oil and gas operators to exercise their mineral rights. Meeting this objective requires basic management controls. Under the Federal Manager's Financial Integrity Act of 1982,[24] we have issued management control standards that apply to all federal agencies.[25] These standards require agencies to identify risks, develop procedures to protect against these risks, and monitor adherence to the procedures. For refuges, doing so would mean identifying the nature and extent of oil and gas activities on a refuge and the risks they pose to refuge resources, adopting risk-reduction procedures such as issuing access permits with conditions to protect refuge resources and securing financial assurance that reclamation will occur, and overseeing oil and gas operations with trained and dedicated staff to ensure compliance with laws and permits.

The refuges we examined varied in the extent to which they identified risks, adopted procedures to minimize those risks, and monitored oil and gas activities. First, some refuge staff did not have complete information on the extent of oil and gas activities occurring on their refuges. For example, at Deep Fork NWR refuge staff estimated that there were 600 or more abandoned wells but knew the location of very few of these wells. Further, as noted earlier, only 67 of the 155 refuges with oil and gas activities and 10 of the 16 refuges we visited (see table 6) had completed CAP studies identifying the possible sources and types of contamination on the refuges. In contrast, at Kenai NWR refuge staff had detailed information on oil and gas wells and activities on the refuge, had completed an exhaustive CAP study, and was completing an Environmental Impact Statement on the effects of oil and gas activities.[26]

[24] 33 U.S.C. § 3512(c).

[25] U.S. General Accounting Office, *Standards for Internal Control in the Federal Government*, GAO/AIMD-00-2131 (Washington, D.C.: Nov. 1999).

[26] *Swanson River Satellites: Natural Gas Exploration and Development Project*, Draft Environmental Impact Statement, U.S. Fish and Wildlife Service—Alaska Region, July 2002.

Table 6: Elements of Management and Oversight Found at Refuges Visited

Refuges Visited by GAO	State	FWS region	CAP study completed	Issue permits with conditions to protect refuge resources	Require bonds	Number of staff
Hopper Mountain NWR	Calif.	1	x			
Deep Fork NWR	Okla.	2	x			
Hagerman NWR	Tex.	2	x	x[a]		
Anahuac NWR	Tex.	2	x	x		
McFaddin NWR	Tex.	2	x	x		
Patoka River NWR	Ind.	3				
Delta NWR	La.	4		x	x[b]	x
Atchafalya NWR	La.	4	x	x		
Sabine NWR	La.	4		x		x
D'Arbonne NWR	La.	4				
Upper Ouachita NWR	La.	4				
John Heinz NWR	Pa.	5		x		
Medicine Lake NWR	Mont.	6	x	x[a]	x[b]	
J. Clark Salyer NWR	N.Dak.	6	x	x[a]	x[b]	
Upper Souris NWR	N.Dak.	6	x	x[a]	x[b]	
Kenai NWR	Alaska	7	x	x	x	One-half time
Total	**16**	**7**	**10**	**11**	**5**	**2.5**

Source: GAO.

[a]The Bureau of Land Management or the Army Corps of Engineers issues these federal permits.

[b]The Bureau of Land Management requires these federal bonds.

Second, permits, which grant oil and gas operators access to specified areas of a refuge and contain conditions to protect refuge resources, such as seasonal or vehicle restrictions, to protect air quality, soil, water and wildlife habitat, were applied to varying degrees at 11 of the 16 refuges we visited.[27] FWS can require permits if the mineral rights are federally owned, the property deed allows it to, or the operator voluntarily agreed to one. In the other five cases, refuge staff did not believe they had authority to require permits. In addition, five refuges obtained financial assurance in the form of bonds for the future costs of reclamation, or rely on bonds administered by another federal agency. The other 11 refuges rely instead on state bonds, which are allowed under FWS guidance, but may provide different degrees of financial assurance than federal bonds. For example, the bonds in some states may or may not cover damages caused by oil and gas activities if the effects are considered to be reasonable impacts to the land. Reasonable impacts are not consistently defined among states because impacts to property are determined by what is usual and customary practice in the area.

Finally, we found little correlation between the scale of oil and gas activities on refuges and the presence of dedicated staff to oversee them. Two of the refuges we visited have a fully dedicated staff person to oversee oil and gas operators—two of the only three in the entire refuge system. These two refuges in Louisiana collect fees from operators to help pay for these staff. In contrast, refuges with greater levels of activity do not have dedicated staff.

[27] Although FWS does not have regulations requiring private mineral rights owners to obtain permits before conducting oil and gas operations, it does have a permitting process (set forth in the FWS manual) that applies to private mineral rights owners whose deeds subject them to permitting requirements; to private mineral rights owners who agree to be bound by a permit, even though their deeds do not subject them to permits; and to others.

FWS's Authority to Require Permits Varies, Depending on the Nature of the Mineral Rights

FWS's legal authority to require oil and gas operators to obtain permits varies considerably, depending upon the nature of the mineral rights. Permits granting access to specified areas of a refuge can be used to establish reasonable operating conditions for private mineral owners to exercise their rights while protecting refuge resources.[28] Variation in authority to require such permits, and the uncertainty that this sometimes creates among refuge staff, partly accounts for differences in management and oversight we found at refuges. At one end of the spectrum, FWS has broad authority to deny or regulate access to oil and gas on wildlife refuges when the federal government owns the mineral rights. Under Department of the Interior regulations, access to federal mineral rights underlying refuges requires the approval of the Secretary of the Interior with the concurrence of FWS as to the time, place, and nature of the activities.[29] These regulations also prohibit leasing of federal minerals on refuges outside of Alaska, except in cases where federal minerals are being drained by operations on property adjacent to the refuges.

[28] In determining what conditions to place in a permit, FWS, like other federal regulatory agencies, must consider the potential applicability of the Fifth Amendment to the U.S. Constitution. The Fifth Amendment prohibits the federal government from taking private property for public use without justly compensating the private property owner. Government regulation may place restrictions on the use of property to the extent that it deprives the owner of its use or economic value. In such cases of "regulatory taking," the owner may be entitled to just compensation under the Fifth Amendment. Thus, if a permit "regulated" the mineral rights to the point that they were deemed to be taken, FWS would have to compensate the owner. *See*, *e.g.*, *Foster v. United States*, 607 F.2d 943 (Ct. Cl. 1979) (government's refusal to allow permit holders of mineral interest on government land any right of access for the purpose of extracting minerals was a compensable taking).

[29] 43 C.F. R. § 3101.5-1.

In contrast, FWS's authority is not nearly as broad or as clear with respect to private owners of mineral rights. FWS's authority to require permits from private mineral owners depends on the nature of the private rights and, in some cases, whether the property deed contains specific language. Private mineral rights may be either "reserved" or "outstanding." Reserved rights are created when the property owner retains the mineral rights at the time that the surface property is transferred to the federal government. Outstanding rights are created when the mineral rights are severed from the surface lands prior to the surface property's transfer to the federal government and, thus, a third party owns the rights. FWS's authority to regulate oil and gas activities of private owners of reserved mineral rights is limited under current law.[30] The Department of the Interior takes the position, with which we agree, that FWS can require permits for reserved rights only if the deed transferring surface ownership to the federal government contains language that subjects these rights to permitting requirements. The department's position was first expressed in a 1986 opinion by the Office of the Solicitor, which, that office recently advised us, continues to reflect the department's position. The department's position is largely based on a section of the Migratory Bird Conservation Act that makes reserved rights subject to government regulation if the deed includes specific requirements, such as permitting requirements, or states that the rights are subject to regulations prescribed by the Department "from time to time."[31] Any expansion of FWS's authority over the owners of reserved mineral rights, to include cases in which deeds do not contain such provisions, would thus require a change in the law.

By contrast, it does not appear that the Department of the Interior has taken a formal position, and the Solicitor's Office recently declined to take a position, regarding FWS's authority to require a permit for private owners of outstanding mineral rights. The Solicitor's Office advised us that it would only provide an opinion on FWS's authority over outstanding mineral rights if FWS requested one. Nonetheless, we believe that FWS has broad general authority, similar to that of the Forest Service and the National Park Service, to require owners exercising outstanding mineral rights to obtain

[30] Appendix III contains a more detailed legal analysis of FWS's authority to require permits for both reserved and outstanding rights owners.

[31] 16 U.S.C. § 715e.

permits that contain conditions to protect a refuge and its wildlife. Both amendments to the National Wildlife Refuge System Administration Act of 1966 (1966 Act) and court decisions since the department issued its 1986 opinion support this conclusion. The National Wildlife System Improvement Act of 1997[32] (1997 Act) amended the 1966 Act to provide for a more effective process for determining which secondary uses would be compatible with refuges and to allow refuges to be managed more like national forests and parks.[33] The 1997 Act established as a mission of the National Wildlife Refuge System "conservation, management, and where appropriate, restoration of [fish and wildlife] for the benefit of present and future generations of Americans." In separate cases involving the Forest Service and the National Park Service, federal courts relied on language similar to that in the 1997 Act to find that these agencies had authority to require private owners of outstanding mineral rights to obtain permits before conducting oil and gas activities.[34] We believe the same conclusion follows with respect to FWS's authority.

As a result of these differences in legal authority, there is a considerable gap in FWS's management and oversight of oil and gas activities, but neither FWS nor we know precisely at how many refuges this is occurring. Because some refuges may consist of hundreds of individual deeds, it is not possible without considerable investigation to determine the relative prevalence of reserved and outstanding mineral rights or the extent to which property deeds allow FWS to require owners of reserved mineral rights to obtain a permit, according to FWS officials. FWS officials also said that differences in FWS's authority to require permits do not provide for a consistent way of managing and overseeing oil and gas activities.

[32] Pub. L. No. 105-57, 111 Stat. 1252 (1997).

[33] H.R. Rep. No. 105-106, at 2-3 (1997).

[34] *See Duncan Energy Co. v. United States Forest Service*, 50 F.3d 584 (8th Cir. 1995); *Dunn McCampbell Royalty Interest, Inc. v. National Park Service*, 964 F. Supp. 1125 (S.D. Tex. 1995), *aff'd on other grounds*, 112 F.3d 1283 (5th Cir. 1997).

Refuges Lack Sufficient Guidance, Resources, and Training to Manage and Oversee Oil and Gas Activities

In addition to FWS's inconsistent or undefined authority to require permits and oversee oil and gas activities, FWS cannot improve its management and oversight of those activities without better guidance, resources, and training. According to refuge managers and officials in the Department of the Interior's Office of the Solicitor, national guidance is insufficient for refuge staff to know what authority they have to manage oil and gas activities, or how to carry out that authority. To supplement the national guidance, three of FWS's seven regions have developed more detailed guidance to assist in managing and overseeing oil and gas activities. For instance, while the national guidance describes only FWS's authority to require permits, guidance in Regions 2 and 6 provides specific examples of conditions the refuge manager should include in a permit to protect refuge resources. Staff at Sabine NWR have also drafted, in conjunction with headquarters staff, more detailed national guidance on managing and overseeing oil and gas activities, including a detailed description of FWS's authority to require permits and many specific conditions to include in permits. However, FWS has not approved this draft guidance.

Refuge staff we interviewed also cited a lack of staff resources as an obstacle to properly managing oil and gas activities because staff do not have time to become familiar with federal and state laws or manage and oversee oil and gas operations. For example, when FWS purchased property for Deep Fork NWR, the property deed contained assurances that FWS would be able to issue permits governing private mineral rights, yet that information was never conveyed to refuge staff. To determine FWS's permitting authority, refuge staff would have to research each individual property deed. Refuge staff said that they do not have time to do this research because they must address other management concerns, such as law enforcement. In contrast, Sabine NWR has a staff person dedicated to managing oil and gas activities. As a result, this person has sufficient time to become familiar with applicable laws and to work with operators and state regulators to manage and oversee oil and gas activities to reduce their effects on the refuge. This oversight has encouraged the operator to identify and restore sites damaged by past oil and gas activities.

Refuges that have access to their own funding mechanisms to recover damages are better able to manage and oversee oil and gas activities. It is standard industry practice for operators' conducting seismic activities to pay exploratory fees to surface landowners. However, only refuges in Louisiana and Texas have authority to assess and retain such fees to cover potential damages caused by seismic activity.[35] Refuges in Louisiana routinely collect these fees to aid management and oversight and fund restoration efforts, but Region 2 has retained existing policy preventing refuges in Texas from assessing these fees. To address this lack of consistency, FWS headquarters officials told us they are drafting guidance to clarify how these regions should apply their authority to collect and retain fees. One of the refuges that collects these fees is Sabine NWR, which uses these fees to fund a staff person specifically dedicated to the management and oversight of oil and gas activities and to fund mitigation projects to reduce the effect of oil and gas operations. Figure 10 shows a recent mitigation project, funded by oil and gas operators at Sabine NWR, that is designed to restore a marsh damaged by saltwater intrusion due in part to earlier oil and gas activities. Officials in the Department of the Interior's Office of the Solicitor support the use of fees as a more efficient mechanism than litigation to compensate for damages.

[35] Under the Consolidated Appropriations Act, 2000, the Secretary of the Interior may retain money paid by parties exercising private oil and gas rights for damages to refuge lands in Texas and Louisiana, to be used to make damage assessments, mitigate or restore the damages, and monitor and study the recovery of the resources. Pub. L. No. 106-113, 113 Stat. 1501A-140 (1999).

Figure 10: Marsh Restoration Project Funded by Oil and Gas Operators at Sabine NWR (La.)

Source: GAO.

Trained staff are integral to effective oversight, yet refuge staff we met with said their principal duties and training as wildlife managers do not prepare them for managing oil and gas activities. FWS has offered only one workshop in the last 10 years for refuge staff nationwide that is specific to managing oil and gas activities on refuges. This 3-day workshop in June 2001, attended by 36 FWS officials, provided information on possible sources of spills, effects of oil on wildlife, enforcement avenues, and damage recovery; however, there was limited discussion of FWS's regulatory authority. Refuge staff lack training on standard industry practices, state and federal laws, and identification of oil- and gas-related problems. For example, at Atchafalaya NWR, the refuge manager has not been able to enforce special use permits, citing a lack of training about applicable state and federal laws.

Acquired Property Is Not Always Adequately Assessed for Contamination

FWS has not always thoroughly assessed property for possible contamination from oil and gas activities prior to its acquisition. The FWS manual requires a thorough investigation of potential contamination prior to acquisition of any property so that the full present and future costs of cleanup can be determined. However, some FWS regions have interpreted the guidance more narrowly than others. As a result, FWS has not always conducted a thorough investigation of properties to be acquired, resulting in unexpected future cleanup costs.

FWS's guidance requires a complete environmental site assessment to determine "the likelihood of the presence of hazardous substances or other environmental problems associated with the property and any remediation or other clean up costs." According to FWS contaminant and realty officials, a thorough investigation as required by the FWS manual would include an assessment of both the surface and subsurface properties for contamination. Some regions consistently conduct adequate assessments, while other regions' investigations are not as thorough. For example, Region 6 assesses both the subsurface and surface properties for contamination, even when acquiring only the surface portion. In two cases, Region 6 did not acquire property, even when offered as a donation, because of subsurface contamination from oil and gas activities. In contrast, FWS Regions 2, 3, and 4 do not always thoroughly investigate all properties for contamination prior to acquisition. For example, not examining the subsurface soils for contamination or investigating further if there is some indication of the presence of contaminants. FWS realty officials told us that the acquisition guidance needs to be clarified and that the oversight of regional implementation needs to be improved to ensure that all new property is thoroughly investigated for contamination.

In one instance, FWS acquired property that is contaminated from oil and gas activities and is now paying unexpected cleanup costs because staff did not conduct an adequate assessment of the subsurface property prior to acquisition. At the Patoka River NWR in Indiana (Region 3), during an acquisition, FWS staff conducted an initial contamination investigation and used a state certification of well closure as assurance that the land was cleaned and closed and did not investigate further, even though they were aware that the land had contained oil wells and an oil storage facility. After acquiring the property, FWS found that large amounts of soil were contaminated with oil. FWS has thus far spent $15,000 and a local conservation group spent another $43,000 cleaning up contaminated soil.

Conclusions

The National Wildlife Refuge System is a national asset established principally for the conservation of wildlife and habitat. While federally owned mineral rights underlying refuge lands are generally not available for oil and gas exploration and production, that prohibition does not extend to the many private parties that own mineral rights underlying refuge lands. The scale of these activities on refuges is such that some refuge resources have been diminished, although the extent is unknown without additional study.

Some refuges have adopted practices—for example, developing data on the nature and extent of activities and their effects on the refuge, overseeing oil and gas operators, and training refuge staff to better carry out their management and oversight responsibilities—that limit the impact of these activities on refuge resources. If these practices were implemented throughout the agency, they could provide better assurance that environmental effects from oil and gas activities are minimized. In particular, in some cases, refuges have issued permits that establish operating conditions for oil and gas activities, giving the refuges greater control over these activities and protecting refuge resources before damage occurs. However, FWS does not have a policy requiring owners of outstanding mineral rights to obtain a permit, although we believe FWS has this authority, and FWS can require owners of reserved mineral rights to obtain a permit if the property deed subjects the rights to such requirements. Expanding or confirming FWS's authority to require reasonable permit conditions and oversee oil and gas activities, including cases where mineral rights have been reserved and the property deed does not already subject the rights to permit requirements, would strengthen and provide greater consistency in FWS's management and oversight. Such a step could be done without infringing on the rights of private mineral owners. Finally, FWS's land acquisition guidance is unclear and oversight is inadequate, thereby exposing the federal government to unexpected cleanup costs for properties acquired without adequately assessing contamination from oil and gas activities.

Recommendations for Executive Action

To improve the framework for managing and overseeing oil and gas activities on national wildlife refuges, the Secretary of the Interior should direct the Director of the Fish and Wildlife Service to take the following steps:

- Collect and maintain better data on the nature and extent of oil and gas activities and the effects of these activities on refuge resources.
- Determine what level of staffing is necessary to adequately oversee oil and gas operators and seek necessary funding to meet those needs, through appropriations, the authority to assess fees, or other means.
- Ensure that staff are adequately trained to oversee oil and gas activities.
- Clarify guidance and better oversee FWS's land acquisition process so that all hazardous substances and environmental problems and future cleanup costs are fully identified prior to acquisition and unexpected costs are avoided.

As part of the process of improving the framework for managing and overseeing oil and gas activities on national wildlife refuges, we further recommend that the Secretary of the Interior and the Director of the Fish and Wildlife Service work with the Department of the Interior's Office of the Solicitor to (1) determine FWS's existing authority to issue permits and set reasonable conditions regarding outstanding mineral rights, reporting the results of its determination to Congress, and (2) seek from Congress, in coordination with appropriate Administration officials, including those within the Executive Office of the President, any necessary additional authority over such rights, and over reserved mineral rights, so that FWS can apply a consistent and reasonable set of regulatory and management controls over all oil and gas activities occurring on national wildlife refuges to protect the public's surface interests.

Matter for Congressional Consideration

In light of the Department of the Interior's perceived limitation to its ability to seek expanded legislative authority over private mineral rights, Congress may wish to consider providing that authority. Ensuring that FWS has legal authority to issue permits to holders of both outstanding and reserved mineral rights would improve FWS's ability to consistently regulate and oversee oil and gas operations on wildlife refuges.

Agency Comments and Our Evaluation

We provided an opportunity for the Department of the Interior and U.S. Fish and Wildlife Service officials to review a draft of this report. The comments of the department as expressed by the Acting Assistant Secretary for Fish and Wildlife and Parks were mixed. The department agreed that FWS's acquisition policy and guidance should be improved. However, the department was silent on our recommendations that the FWS should collect and maintain better data on oil and gas activities and their effects and that it should ensure that staff are adequately trained to oversee oil and gas activities. We continue to believe these recommendations are still warranted. The department did raise a concern in regards to two of our recommendations. First, the department questioned whether hiring additional dedicated staff would be the most cost-effective solution to improving oversight. However, the department apparently misinterpreted our recommendation for FWS to determine what level of staffing necessary to oversee these activities as a call to hire additional dedicated staff. If the department determines that there are more cost-effective means to ensure adequate staffing, such as the use of contractors or temporary staff, it could pursue those actions and be responsive to this recommendation. Second, while the department was silent on whether it would review the FWS's authority to regulate surface access to refuges for owners of outstanding mineral rights, the department did raise concerns about GAO's recommendation that it seek additional authority from Congress to regulate reserved mineral rights. According to the department, it would be unconstitutional for it (as an executive branch department) to make such a request to Congress, because doing so would infringe upon the President's authority to recommend legislation to Congress under the U.S. Constitution's Recommendations Clause. We fully anticipated in making this draft recommendation that the department would coordinate its legislative proposals with the President. In order to make this explicit, we clarified the recommendation to recognize that the department should coordinate its legislative request to Congress through appropriate Administration officials, including those within the Executive Office of the President.

Further, as a legal matter, while the Recommendations Clause explicitly provides for the President to make recommendations to Congress, it does not deny that same freedom to others. The courts have ruled that ". . . anyone can propose legislation."[36]

The department also disagreed with our characterization of lost condor habitat at Hooper Mountain NWR in California. The department asked that we cite the source for this characterization and include additional clarification and explanation of the effect of oil and gas activities on the condor reintroduction program at this refuge. FWS itself, in 1980, made the determination that 70 percent of critical condor habitat was lost due to oil and gas development at Hopper Mountain NWR. However, this calculation included both refuge and off-refuge lands. Considering only refuge lands, lost habitat totaled 63 percent and the report has been revised accordingly.

In an attachment to the letter, the Department of the Interior raised three additional concerns with our report. These involve our characterizations of FWS's land acquisition practices, our inclusion of oil and gas pipelines in the scope of the report, and the significance of problems associated with oil and gas activities. First, FWS concurred that its acquisition policy and guidance could be improved and that regional implementation has at times been inadequate. Nevertheless, FWS took exception to our citing problems we found at Patoka River NWR and with that region's adherence to established policy in conducting its site assessment. However, our review clearly indicated that the FWS failed to conduct additional contamination investigation of lands that FWS officials knew had supported oil and gas extraction and storage, as required by their policy. As a result, the FWS acquired lands that are contaminated and has incurred expenses to remediate that contamination.

[36] *See Association of Am. Physicians & Surgeons, Inc. v. Clinton*, 997 F.2d 898, 908 (D.C. Cir. 1993)("The President has the undisputed authority to recommend legislation but he need not exercise that authority with respect to any particular subject or, for that matter, any subject . . .. [*A*]*nyone in the country can propose legislation*.") (emphasis added).

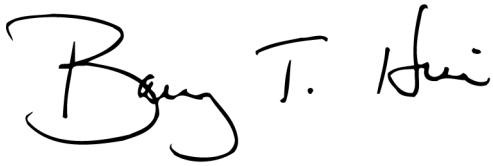
Second, the department's Office of the Solicitor raised a concern that including oil and gas pipelines as an oil and gas activity overstates the prevalence of oil and gas activities. We disagree; pipeline leaks have contributed to refuge contamination and affected refuge operations in other ways. We believe that inclusion of oil and gas pipelines on refuges is an important factor in assessing the overall scale of oil and gas activities on refuges. Nevertheless, we have added additional information to the report that allows readers to differentiate among the types of activities on refuges, including pipelines.

Third, the department's Office of Policy Analysis expressed the view that our reporting of refuge-based oil and gas activities not previously known to FWS overstated the problem because we did not link these activities to "significant detrimental" effects. The department also suggested that any problems associated with oil and gas activities on refuges should be considered relative to other problems faced by these refuges. However, our report already states that FWS has not conducted a cumulative assessment of the effects of oil and gas activities on individual refuges or the refuge system as a whole. Identifying the presence of these activities should be the first step toward any such assessment. Comparing these impacts relative to other threats to refuges is outside the scope of this report.

Finally, the department included a number of technical comments from the FWS and various department offices that have been incorporated within the report as appropriate. The Department of the Interior's letter and our comments on the letter appear in appendix V.

We conducted our work from June 2002 through March 2003 in accordance with generally accepted government auditing standards. Appendix IV contains details of our scope and methodology.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies of this report to the Secretary of the Interior and the Director of the U.S. Fish and Wildlife Service.
In addition, the report will be available at no charge on the GAO Web site at http://www.gao.gov. If you have any questions about this report, please call me at (202) 512-3841 or William Swick at (206) 287-4851. Key contributors to this report are listed in appendix VI.



Barry T. Hill
Director, Natural Resources
and Environment

Refuges with Oil and Gas Activities

Name	FWS region	State	Active wells	Inactive wells	Exploration activities	Pipelines
Alligator River National Wildlife Refuge (NWR)	4	N.C.	0	9	x	
Anahuac NWR	2	Tex.	50	16		x
Aransas NWR	2	Tex.	14	95	x	x
Arapaho NWR	6	Colo.	0	1		
Arctic NWR	7	Alaska			x	
Arrowwood NWR	6	N.D.	0	1		
Atchafalaya NWR	4	La.	2	35	x	x
Attwater Prairie Chicken NWR	2	Tex.	0	11	x	x
Audubon Wetland Management District (WMD)	6	N.D.			x	
Bald Knob NWR	4	Ark.	0	1		x
Bayou Cocodrie NWR	4	La.	0	36		x
Bayou Sauvage NWR	4	La.	0	4		x
Bear Lake NWR	1	Idaho	0	1		
Benton Lake NWR	6	Mont.				x
Benton Lake WMD	6	Mont.				x
Big Boggy NWR	2	Tex.	0	1	x	x
Big Branch Marsh NWR	4	La.	0	4		x
Big Oaks NWR	3	Ind.	0	2		
Bitter Creek NWR	1	Calif.	0	11		x
Bitter Lake NWR	2	N.M.	0	28		x
Black Bayou Lake NWR	4	La.	20	6		x
Bogue Chitto NWR	4	La.				x
Bosque del Apache NWR	2	N.M.				x
Bowdoin Lake NWR	6	Mont.	0	2		
Bowdoin WMD	6	Mont.			x	x
Brazoria NWR	2	Tex.	4	25		x
Breton NWR	4	La.			x	x
Buenos Aires NWR	2	Ariz.	0	1		
Buffalo Lake NWR	2	Tex.				x
Butte Sink Wildlife Management Area	1	Calif.	0	1	x	
Cache River NWR	4	Ark.	0	6		x
Cameron Prairie NWR	4	La.	0	10	x	x

(Continued From Previous Page)

Name	FWS region	State	Active wells	Inactive wells	Exploration activities	Pipelines
Canaan Valley NWR	5	W.V.	2	0	x	x
Carolina Sandhills NWR	4	S.C.				x
Catahoula NWR	4	La.	8	49		x
Choctaw NWR	4	Ala.	3	6		x
Cibola NWR	2	Ariz.				x
Colusa NWR	1	Calif.	0	2		
Crab Orchard NWR	3	Ill.	0	20		x
Crosby WMD	6	N.D.	9	3	x	x
Cypress Creek NWR	3	Ill.	0	4		
Dahomey NWR	4	Miss.				x
D'Arbonne NWR	4	La.	51	88		x
Deep Fork NWR	2	Okla.	0	362		x
Delevan NWR	1	Calif.	0	7		
Delta NWR	4	La.	178	160	x	x
Des Lacs NWR	6	N.D.			x	
Detroit Lakes WMD	3	Minn.				x
Devils Lake WMD	6	N.D.	0	1		
Egmont Key NWR	4	Fla.			x	
Emiquon NWR	3	Ill.	0	12		
Erie NWR	5	Penn.	2	0		x
Fallon NWR	1	Nev.	0	1		
Felsenthal NWR	4	Ark.	0	60		x
Flint Hills NWR	6	Kans.	3	10		x
Florida Panther NWR	4	Fla.	0	1		
Grand Bay NWR	4	Miss.				x
Grand Cote NWR	4	La.	0	1		x
Great Dismal Swamp NWR	5	Va.				x
Guadalupe-Nipomo Dunes NWR	1	Calif.	0	2		
Guam NWR	1	Guam			x	
Hagerman NWR	2	Tex.	98	93	x	x
Hailstone NWR	6	Mont.	0	1		
Halfbreed Lake NWR	6	Mont.	1	4		x
Handy Brake NWR	4	La.				x
Hatchie NWR	4	Tenn.				x
Havasu NWR	2	Ariz.				x
Hewitt Lake NWR	6	Mont.	3	2		x

(Continued From Previous Page)

Name	FWS region	State	Active wells	Inactive wells	Exploration activities	Pipelines
Hillside NWR	4	Miss.	0	3		
Hopper Mountain NWR	1	Calif.	15	2		x
Humboldt Bay NWR	1	Calif.				x
J. Clark Salyer NWR	6	N.D.	0	26		x
J. Clark Salyer WMD	6	N.D.	1	2		
John Heinz NWR	5	Penn.				x
Kenai NWR	7	Alaska	121	43	x	x
Kern NWR	1	Calif.	0	2		x
Kirtlands Warbler NWR	3	Mich.	2	15	x	x
Kirwin NWR	6	Kan.	0	1		
Kofa NWR	2	Ariz.				x
Lacassine NWR	4	La.	2	67	x	x
Laguna Atascosa NWR	2	Tex.	5	7		x
Lake Mason NWR	6	Mont.	0	5		
Lake Ophelia NWR	4	La.			x	x
Lake Thibadeau NWR	6	Mont.				x
Leopold WMD	3	Wisc.				x
Litchfield WMD	3	Minn.				x
Little River NWR	2	Okla.	0	4		
Lostwood WMD	6	N.D.	0	1	x	
Louisiana WMD	4	La.				x
Lower Rio Grande Valley NWR	2	Tex.	65	152	x	x
Mandalay NWR	4	La.	5	34		x
Mark Twain NWR	3	Ill.				x
Matagorda Island NWR	2	Tex.				x
Mathews Brake NWR	4	Miss.	0	1		
Mattamuskeet NWR	4	N.C.	0	1		
McFaddin NWR	2	Tex.	76	29		x
Medicine Lake NWR	6	Mont.	2	2	x	x
Medicine Lake WMD	6	Mont.			x	x
Merced NWR	1	Calif.	0	1		
Meredosia NWR	3	Ill.	0	1		
Merritt Island NWR	4	Fla.				x
Minnesota Valley NWR	3	Minn.				x
Mississippi Sandhill Crane NWR	4	Miss.	0	1		x
Mississippi WMD	4	Miss.				x

(Continued From Previous Page)

Name	FWS region	State	Active wells	Inactive wells	Exploration activities	Pipelines
Montezuma NWR	5	N.Y.	0	1		x
Moody NWR	2	Tex.				x
Mortenson Lake NWR	6	Wyo.	0	1		
Nisqually NWR	1	Wash.				x
Ohio River Islands NWR	5	W.V.	11	10		x
Optima NWR	2	Okla.	0	15		x
Ouray NWR	6	Utah	2	5		x
Overflow NWR	4	Ark.	0	2		x
Panther Swamp NWR	4	Miss.	0	13		x
Patoka River NWR	3	Ind.	0	54		x
Pea Island NWR	4	N.C.			x	
Pixley NWR	1	Calif.	0	1		
Pond Creek NWR	4	Ark.				x
Port Louisa NWR	3	Iowa				x
Quivira NWR	6	Kan.	51	98	x	x
Rocky Mountain Arsenal NWR	6	Colo.	0	1		x
Sabine NWR	4	La.	8	51	x	x
Sacramento River NWR	1	Calif.	1	14	x	x
Saddle Mountain NWR	1	Wash.	0	26		
Salt Plains NWR	2	Okla.	0	9		x
Salton Sea NWR	1	Calif.			x	
San Bernard NWR	2	Tex.	3	16	x	x
San Luis NWR	1	Calif.	0	4		
San Pablo Bay NWR	1	Calif.	0	1		
Santa Ana NWR	2	Tex.	0	2		
Seal Beach NWR	1	Calif.	15	15		x
Sequoyah NWR	2	Okla.	0	2	x	
Sherburne NWR	3	Minn.				x
Shiawassee NWR	3	Mich.	0	4		x
Squaw Creek NWR	3	Mo.	0	1		
St. Catherine Creek NWR	4	Miss.	64	401	x	x
Stillwater NWR	1	Nev.	0	5		
Stone Lakes NWR	1	Calif.	0	2		x
Sutter NWR	1	Calif.	1	3	x	x
Ten Thousand Islands NWR	4	Fla.	0	1		
Tensas River NWR	4	La.			x	x

(Continued From Previous Page)

Name	FWS region	State	Active wells	Inactive wells	Exploration activities	Pipelines
Tetlin NWR	7	Alaska				x
Texas Point NWR	2	Tex.	0	3	x	x
Tishomingo NWR	2	Okla.	0	6	x	
Trinity River NWR	2	Tex.	0	3	x	x
Upper Mississippi River NWR	3	Wisc.	0	1		x
Upper Ouachita NWR	4	La.	908	212	x	x
Upper Souris NWR	6	N.D.	0	10	x	x
Washita NWR	2	Okla.	0	10		x
Wheeler NWR	4	Ala.			x	x
White River NWR	4	Ark.				x
Whittlesey Creek NWR	3	Wisc.				x
Willapa Bay NWR	1	Wash.	0	1		
Windom WMD	3	Minn.				x
Yukon Delta NWR	7	Alaska			x	
Yukon Flats NWR	7	Alaska			x	
Total			**1806**	**2600**	**44**	**107**

Sources: Premier Data Services (well data), FWS (exploration and pipeline data), and DOT (pipeline data).

Summary of Oil and Gas Activities at Refuges Visited

Refuge (State/FWS region)	Nature and extent of oil and gas activity	Environmental effects	Management and oversight
Hopper Mountain NWR (Calif./1)	• 17 wells (15 active) • 3 production pads • Unknown number of flow lines	Feeding habitat for endangered California condors on refuge reduced by 63 percent. Minor soil contamination from oil spills.	County issues conditional use permits and works closely with the Fish and Wildlife Service (FWS).
Deep Fork NWR (Okla./2)	• 362 wells • Unknown number of flow lines	Old and unused infrastructure and numerous unplugged wells. Brine spills have killed vegetation.	Although the property deed stipulates that a special use permit and bond are required, the refuge does not require permits or bonds.
Hagerman NWR (Tex./2)	• 191 wells (98 active) • 5 production pads • 2 transmission lines and several flow lines	Old and unused infrastructure and numerous unplugged wells.	All oil and gas activities are permitted through the Army Corps of Engineers with FWS input.
Anahuac NWR (Tex./2)	• 66 wells (50 active) • 3 production pads • 3 transmission lines, numerous flow lines	Oil spills have killed wildlife and brine spills have killed vegetation. Abandoned infrastructure, including flow lines and storage tanks remain at site.	Refuge sometimes issues voluntary permits. Do not require operators to post bonds, but in one case, has collected fees for damage that exceeded the conditions of the special use permit.
McFaddin NWR (Tex./2)	• 105 wells (76 active) • 3 production pads • 5 major transmission lines	Soil and groundwater contamination from oil spills. Abandoned infrastructure remains at site.	Refuge issues voluntary special use permits with conditions to protect refuge resources.
Patoka River NWR (Ind./3)	• 54 wells • 3 transmission lines, numerous flow lines	Soil and water contamination from oil spills. Abandoned infrastructure remains at site.	Refuge does not require voluntary use permits or bonds.
Delta NWR (La./4)	• 338 wells (178 active) • 2 fields, each with production facilities • 6 transmission lines and large storage facility	Sediment contaminated by oil spills. Saltwater intrusion due to subsidence. Abandoned infrastructure remains at the site.	Refuge issues special use and right-of-way permits with conditions imposed by FWS and collects mitigation fees. One staff dedicated to oversight activities.
Atchafalya NWR (La./4)	• 37 wells (2 active) • 3 production pads • 5 transmission lines and numerous flow lines	Brine spills have killed vegetation. Old and unused infrastructure, including storage tanks, remains at the site.	Although the property deed requires a special use permit and an approved plan of operations, the refuge has not requested a plan of operations. In the past, the refuge has issued special use permits, but the current operator refuses to agree to their conditions.

(Continued From Previous Page)

Refuge (State/FWS region)	Nature and extent of oil and gas activity	Environmental effects	Management and oversight
Sabine NWR (La./4)	• 59 wells (8 active) • 4 production pads with storage and separation facilities • 9 transmission lines (100 miles) and 40 active flow lines (50 miles)	Pipeline spill caused wildlife fatalities and contamination. Habitat loss from saltwater intrusion and construction of roads, canals, and other facilities. Habitat fragmentation has contributed to increased number of predators.	The refuge collects fees from operators to fund full-time oversight position. Voluntary permits issued to manage operator activities.
D'Arbonne NWR (La./4)	• 139 wells (51 active) • 1 storage and injection facility • 5 transit pipelines (75 miles) and numerous flow lines (199 miles)	Soil and vegetation damage from brine spills and old disposal pits. Mercury contamination. Numerous abandoned wells remain at the site.	The refuge does not issue permits for any of the gas activities and relies on operator cooperation.
Upper Ouachita NWR (La./4)	• 1,120 wells (908 active) • No production pads • 13 transmission lines (31 miles) and numerous flow lines (313 miles)	Soil and vegetation damage from brine spills and old disposal pits. Mercury contamination. Numerous abandoned wells remain at the site.	The refuge does not issue permits for any of the gas activities and relies on operator cooperation.
John Heinz NWR (Penn./5)	• 10 transmission pipelines	Large pipeline spill resulting in wildlife deaths and soil and sediment contamination.	The refuge issues permits for maintenance activities.
Medicine Lake NWR/WMD (Mont./6)	• 4 wells (2 active) • 2 production pads • Numerous flow lines	Minor soil contamination from oil spills.	The refuge staff have developed regional management policy and attach conditions to federal permits. The refuge assesses a fee for seismic activities.
J. Clark Salyer NWR and WMD (N.D./6)	• 29 wells (1 active) • 2 production pads • Numerous flow lines	Unknown soil contamination from oil spills.	The refuge staff have developed regional management policy and attach conditions to federal permits. The refuge assesses a fee for seismic activities.
Upper Souris NWR (N.D./6)	• 10 wells • 1 production pad • Numerous flow lines	Minor soil contamination from oil spills.	The refuge staff have developed regional management policy and attach conditions to federal permits. The refuge assesses a fee for seismic activities.
Kenai NWR (Alaska/7)	• 164 wells (121 active) • 60 production pads • Numerous flow lines	Soil and water contamination from numerous oil spills. Mercury and polychlorinated biphenyl contamination. Lost habitat from infrastructure development.	The refuge issues right of way and special use permits and requires bonds.

Source: GAO.

Analysis of Legal Authority of the Fish and Wildlife Service to Impose Prospective Permit Requirements

The Fish and Wildlife Service's current authority to regulate, prospectively, the oil and gas activities of private owners of "reserved" and "outstanding" mineral rights[1] on national wildlife refuges (and those who obtain mineral rights from these private owners) is limited in a number of ways.[2] FWS's authority over owners of reserved mineral rights is limited by statute, to those instances in which the deed transferring the land from the mineral rights owner to the federal government includes language either requiring permits or requiring compliance with regulations the Department of the Interior may adopt in the future, including permitting regulations. FWS's authority over owners of outstanding mineral rights is limited in the sense that FWS's regulations do not currently require permits. Two of FWS's sister land management agencies—the National Park Service and the United States Forest Service—have regulations that require outstanding mineral rights owners to obtain permits before engaging in oil and gas activities on federal lands they manage.[3] FWS, on the other hand, has no such regulations. As discussed below, while it appears that the Department of the Interior has not taken a formal position on whether FWS has legal authority to promulgate such regulations, we conclude it has such authority, under its statutes and related case law.

[1] Privately owned mineral rights within wildlife refuges may be "reserved" or "outstanding." Reserved mineral rights are those that were reserved by the owner when ownership of the surface land was transferred to the federal government. Outstanding mineral rights are those that were reserved before the surface was transferred to the federal government, and thus are owned by someone other than the party making the transfer to the government.

[2] In addition to FWS's potential authority to establish controls on oil and gas activities on federal lands in advance of commencement of those activities, FWS also may have rights, under state law, to address the results of those activities after they occur. In particular, FWS generally has a typical landowner's right to seek monetary damages and injunctive relief for contamination and other injury from activities beyond those reasonably necessary to explore and extract underlying minerals. *See*, *e.g.*, *United Geophysical Corp. v. Culver*, 394 F.2d 393 (5th Cir. 1964); *Flying Diamond Corp. v. Rust*, 551 P.2d 509 (Utah 1976); *Guffey v. Stroud*, 16 S.W.2d 527 (Tex. Comm. App. 1929).

[3] *See* 36 C.F.R. § 9.32 (Park Service); 36 C.F.R. § 51. 50(a) (Forest Service). The Forest Service regulations are "special use" permit regulations that have been applied to outstanding mineral rights. *See Duncan Energy Co. v. United States Forest Service*, 50 F.3d 584 (8th Cir. 1995).

Reserved Rights

The Department of the Interior believes, and we agree, that FWS has legal authority to require private owners of reserved mineral rights located within "acquired federal refuges" to obtain "entry permits" only in limited circumstances, in order to obtain access to the refuge for minerals exploration and removal. The department's position was originally set out in a 1986 legal opinion issued by the department's Office of the Solicitor (1986 Opinion),[4] and the office recently advised us that the 1986 Opinion continues to reflect the department's position. The 1986 Opinion concluded that FWS generally lacks statutory or other authority to require entry permits for reserved rights owners and can do so only when the deed transferring the surface property to the federal government has included either specific permitting requirements or language subjecting the exercise of the reserved mineral rights to regulations promulgated by the department, including permitting regulations. The department's position is based on language in the Migratory Bird Conservation Act that was added by amendment in 1935, making reserved rights subject to requirements specifically set out in the deed or, if the deed so states, to regulations prescribed "from time to time" by the Secretary of the Interior.[5] If the deed does not contain such provisions, the exercise of the reserved rights cannot be subjected to permitting requirements.

[4] *See* Memorandum from the Associate Solicitor, Conservation and Wildlife, to the Assistant Secretary, Fish and Wildlife and Parks, "Fish and Wildlife Service authority to regulate use of reserved mineral interests on National Wildlife Refuge lands," FWS.CW.0661 (Dec. 22, 1986).

[5] *See* Act of June 15, 1935, ch. 261, § 301, 49 Stat. 378, 381-82, *codified at* 16 U.S.C. § 715e ("it shall be expressed in the deed or lease that the use, occupation, and operation of [reserved interests retained by a grantor or lessor from whom the government acquires land or wildlife refuges] shall be subordinate to and subject to such rules and regulations as are set out in such deed or lease or, if deemed necessary by the Secretary of the Interior, to such rules and regulations as may be prescribed by him from time to time").

As the 1986 Opinion explains, prior to the 1935 amendment, the Migratory Bird Conservation Act had made all reserved rights subject to regulations that were prescribed by the department "from time to time."[6] The House Report associated with the 1935 amendment explains that "some owners of very desirable tracts are unwilling to convey [property] on such indefinite and uncertain terms as regulations made 'from time to time.' "[7] The purpose of the change was to provide those who reserved rights in lands they transferred to the United States with some contractual certainty, and to protect them from being required to abide by permitting regulations that were not in effect when the deed was issued.[8]

Outstanding Rights

The foregoing limits in the Migratory Bird Conservation Act on how the department may regulate reserved mineral rights do not apply to the department's regulation of outstanding mineral rights. A number of other legal authorities in related areas indicate, in our view, that FWS has statutory authority to regulate the exercise of outstanding mineral rights on federal lands.

In *Dunn McCampbell Royalty Interest, Inc. v. National Park Service*, 964 F. Supp. 1125 (S.D. Tex. 1995), *aff'd on other grounds*, 112 F.3d 1283 (5th Cir. 1997), the court ruled that the National Park Service has authority to reasonably regulate private owners' access to their oil and gas interests located beneath park system lands, by requiring approval of a plan of operations before commencement of exploration or production activities. The court relied on language in the National Park Service Organic Act directing the Park Service to "protect and regulate" national parks so as to "conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations," as well as language directing the Department of the Interior

[6] *See* Act of Feb. 18, 1929, ch. 257, § 6, 45 Stat.1222, 1223.

[7] H.R. Rep. No. 74-886, at 2 (1935).

[8] *United States v. Little Lake Land Co.*, 412 U.S. 580, 597-99 (1973). *See also Caire v. Fulton*, No. 84-3184 (W.D. La. Feb. 10, 1986) (relying on the 1935 amendment and legislative history in holding that Interior did not have authority to impose permitting requirements on private owners of mineral interests when those interests were reserved from federal control as part of the acquisition of the land through condemnation).

to issue regulations "as . . . deem[ed] necessary or proper for the use of the parks . . . under the jurisdiction of the National Park Service."[9]

Similarly, in *Duncan Energy Co. v. United States Forest Service*, 50 F.3d 584 (8th Cir. 1995), the Eighth Circuit court ruled that although the Forest Service may not completely deny access to private owners of mineral interests located within National Forest System lands, the Forest Service may impose reasonable conditions on the use of the federally owned surface and thus may require mineral owners to obtain approval before exploring for or developing minerals. The court relied on language in the Bankhead-Jones Farm Tenant Act that directs the Department of Agriculture (the Forest Service's parent agency) "to develop a program of land conservation and land utilization" and to issue regulations necessary to "regulate the use and occupancy of property acquired [for the National Forest System] in order to conserve and utilize it."[10] The court also relied on the Forest Service's "special use" regulations providing that "[a]ll uses of National Forest System lands . . . are designated 'special uses' [and must be approved by an] authorized officer.[11]

The statutes addressed in *Dunn McCampbell* and *Duncan* bear a number of similarities to the National Wildlife Refuge System Administration Act (Refuge System Administration Act), which governs the National Wildlife Refuge System. Notably, language added to the Refuge System Administration Act by the National Wildlife Refuge System Improvement Act of 1997 is very similar to the language of the National Park Service Organic Act relied upon by the *Dunn McCampbell* court. As amended in 1997, the Refuge System Administration Act now provides that the mission of the NWRS is to administer lands for the "conservation, management, and where appropriate, restoration of [fish and wildlife] for the benefit of present and future generations of Americans" and directs the Secretary of the Interior to "ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of

[9] 16 U.S.C. §§ 1, 3; *see* 964 F. Supp. at 1133. The court in *Dunn McCampbell* left open the possibility that the Park Service's regulation of the mineral interests might constitute a "taking" for which the owner should have been compensated under the Fifth Amendment to the Constitution, and the court transferred the dispute over the owner's taking claims to the appropriate judicial forum in *Dunn McCampbell*.

[10] 50 F.3d at 589, citing 7 U.S.C. §§ 1010, 1011(f).

[11] 50 F.3d at 589, citing 36 C.F.R. § 251.50(a).

present and future generations of Americans."[12] The Refuge System Administration Act also explicitly authorizes the Secretary of the Interior to issue regulations to carry out the act.[13] Similarly, as in the statute relied on by the *Duncan* court regarding the Forest Service's permitting authority, the 1997 amendments to the Refuge System Administration Act added language directing the Secretary of the Interior to "provide for the conservation of fish, wildlife, and plants, and their habitats within the [Refuge] System."[14]

Thus, as with the statutes at issue in *Dunn McCampbell* and *Duncan*, the 1997 amendments to the Refuge System Administration Act authorize the Department of the Interior to manage the National Wildlife Refuge System with the same type of policy direction and management standards with which the Park System and the Forest System are managed, including issuance of permitting regulations.[15] The legislative history of the Refuge System Administration Act confirms Congress's concern for ecosystem and fish and wildlife conservation and for ensuring that uses of the refuges are compatible with their purposes.[16] Although neither the Administration Act's 1997 amendments nor their legislative history specifically refers to regulation of the activities of private oil and gas operators, the overriding purpose of the amendments—providing better management to protect the refuges—together with the reasoning of the courts addressing similar statutes in *Dunn McCampbell* and *Duncan* indicate that FWS has current authority to require private owners of outstanding mineral rights to obtain permits before conducting oil and gas operations.

[12] 16 U.S.C. §§ 668dd(a)(2), (a)(4)(B), added by Pub. L. No. 105-57, §§ 4, 5(a), 111 Stat. 1252, 1254 (1997).

[13] 16 U.S.C. § 668dd(b)(5).

[14] 16 U.S.C. § 668dd(a)(4)(A), added by Pub. L. No. 105-57, § 5(a), 111 Stat. 1252, 1254 (1997).

[15] *See* H.R. Rep. No. 105-106, at 3 (1997).

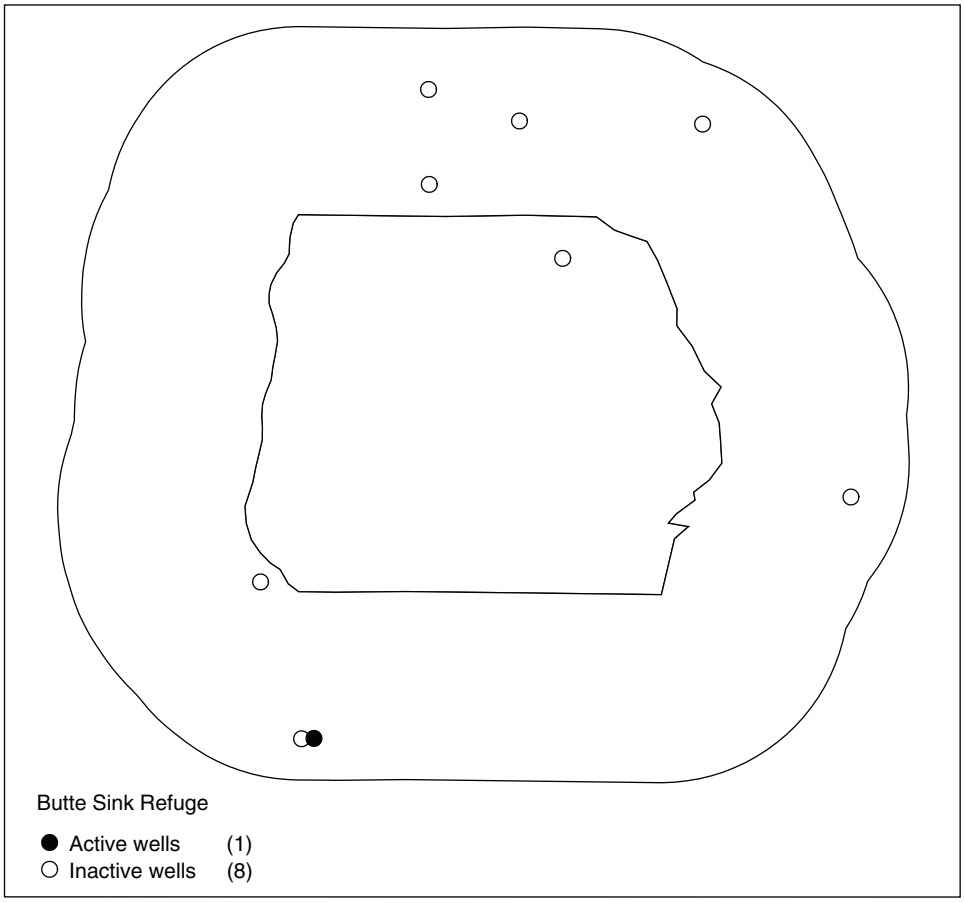
[16] *Id.* at 3-4, 8, 9.

Scope and Methodology

To identify the nature and extent of oil and gas activities resident within the National Wildlife System, we relied on several sources of information. We began with our 2001 report, which identified 77 units with oil and gas activities based on the Fish and Wildlife Service's reported activities in the year 2000. We used the same information source, FWS's Refuge Management Information System (RMIS), and reviewed exploration, production, and pipeline activities for the years 1994-2001. This information is self-reported by refuges and, by FWS officials' admission, incomplete. In addition, RMIS does not indicate the scale of activities present on a refuge—for example, whether there is one well or hundreds of wells. Therefore, we contracted Premier Data Services of Englewood, Colorado, to provide more accurate and comprehensive data on the extent and type of oil and gas activities occurring on refuges. Premier maintains a national database of oil and gas wells collected from well permit data compiled by each state's oil and gas regulators. Premier recently contributed to a study for the Departments of Interior, Agriculture, and Energy under the Energy Policy and Conservation Act, providing a comprehensive review of oil and gas resources and constraints on their development in five basins in the interior West.

To determine the number of wells residing on FWS lands, Premier compared a county-by-county listing of wells against a list of counties with refuge system lands provided by FWS. For those refuges in counties with at least one well, Premier either obtained digital maps of the refuges' current land status from FWS or, in those cases where FWS had not digitized the refuge boundaries, converted paper maps into digital format. Premier then overlaid the geographic plots of wells nationwide with the digitized maps to identify wells within refuge boundaries and to identify wells within ½ mile outside the boundaries. (See fig. 11 for a sample plot of the Butte Sink Wildlife Management Area.) In addition to obtaining information on the location of oil and gas wells, we also obtained information on the status, type, and amount of production of oil, gas, and water (brine) from each well. We eliminated from the database permitted wells that were not drilled, while wells with any production in the most recent reporting period we categorized as active; all other wells we categorized as inactive.

Figure 11: Butte Sink Wildlife Management Area (Calif.), Plot of Wells and One-Half Mile Boundary



Source: Premier Data Services (data) and GAO (analysis).

To identify pipelines transiting refuge lands, we relied on the National Pipeline Mapping System (NPMS), which is maintained by the Office of Pipeline Safety in the Department of Transportation and on FWS's RMIS. We overlaid the NPMS data on the 138 refuges for which we had digital refuge boundary data because they also had wells inside or just outside their boundaries. The FWS had not finished digitizing refuge maps for the other refuges in the system. NPMS is based on data reported to the Office of Pipeline Safety by pipeline owners. NPMS includes 99 percent of the nation's hazardous liquids (including oil and other petroleum products) pipelines and 61 percent of natural gas pipelines in the United States.

NPMS does not include local gathering lines or pumping and storage facilities that supplement these lines. To supplement this information, we included refuges identified in RMIS as having transit pipelines. However, there may be other refuges with pipelines, not recorded in NPMS, RMIS, or for which we did not have digital maps.

As part of FWS's review of this report, they identified additional refuges that may have oil and gas activities or updated the status of activities at the refuges listed, but did not offer corroborating documentation. While this information may have been more current than the Premier or the Department of Transportation databases, we chose to keep these data intact and did not make additional adjustments.

We attempted to identify information regarding the overall environmental effects of oil and gas activities on national wildlife refuges. However, because FWS had conducted few studies and did not have information regarding what the overall environmental effects of oil and gas activities on refuges were and how those effects have changed over time, we selected at least one refuge in each of FWS's seven regions for physical inspection. In making these selections, we attempted to choose a cross section of refuges considering the type and scale of oil and gas activities, range of environmental effects, and extent and type of management and oversight. In total, we visited 16 refuges containing 1,510 active and 2,695 total oil and gas wells, about 84 percent and 61 percent, respectively, of all oil and gas wells we identified on refuges. For a complete list of refuges we visited, see appendix II. At each refuge visited, we asked the refuge manager to describe the effects of oil and gas activities on the refuge, obtained any available studies of these effects, and visited locations of oil and gas activity selected by the refuge manager to represent a range of effects. In addition, we contacted state regulators and industry and environmental representatives and reviewed state laws, FWS contaminant reports, and scientific and industry and environmental group reports. To identify reclamation and remediation performed at the refuges visited, we reviewed files at each refuge, discussed actions taken with refuge officials, and reviewed information FWS provided from its cleanup and maintenance databases. To identify steps FWS has taken to document the environmental effect on refuge resources, we reviewed Contaminant Assessment Program studies and additional information FWS provided from its contaminants database. We also discussed these efforts with FWS officials.

To assess FWS's management and oversight of oil and gas activities in the National Wildlife Refuge System, we obtained information on policy,

guidance, and practices from headquarters and the seven regional offices and documented the actual practices in use at the 16 refuges we visited. To determine the authority of the FWS to require private mineral owners to obtain permits containing conditions to protect refuge resources from damage and to oversee oil and gas activities, we obtained information from the Department of the Interior's Office of the Solicitor and reviewed the laws and regulations pertaining to the FWS and other federal land management agencies and recent court cases concerning private mineral rights on federal lands. We also identified the type and amount of training the FWS staff had received and reviewed mechanisms for funding positions to manage and oversee oil and gas activities. In addition, we interviewed officials and obtained documentation on FWS's coordination with, and the involvement of, other federal and state agencies in the oversight of oil and gas activities on refuges. Finally, we reviewed the acquisition policies and practices used by FWS for adding lands to the refuge system, especially those that contain current or historical oil and gas activities.

Comments from the Department of the Interior and U.S. Fish and Wildlife Service

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

JUL 18 2003

Mr. Barry T. Hill
Director, Natural Resources and Environment
U.S. General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Hill:

The Department of the Interior is providing comments on the draft U.S. General Accounting Office report entitled, "National Wildlife Refuges: Opportunities to Improve the Management and Oversight of Oil and Gas Activities on Federal Lands" (GAO-03-517).

See comment 1.

We appreciate the opportunity to review the draft report. However, we remain concerned that the review process determined by GAO (reading the report at meetings, taking notes, and returning the reports to GAO at the end of the meetings) was not sufficient for such a data intensive report. Our ability to comment fully was hampered by the report review process.

See comment 2.

We are concerned that you are proposing to recommend that the Secretary request new legislation relating to Service authority to manage refuge oil and gas activities. This potentially infringes upon the President's authority to decide whether the Executive Branch should propose legislation. While normally recommendations from any source are only recommendations, there are statutory requirements for the Secretary of the Interior to provide a statement to the Congress within 60 calendar days of receipt on what actions have been taken or what actions are planned to implement GAO's recommendations. However, under the Recommendations Clause of the Constitution, the question of whether any Department should recommend legislation on any subject is solely within the President's discretion. Accordingly, we urge you to drop or revise your approach on this particular matter.

See comment 3.

In addition, the report references "loss of approximately 70% of feeding habitat for California condors at Hopper Mountain NWR as a result of oil and gas activities." These comments require extensive clarification, beginning with GAO documenting the basis for the 70% figure.

Hopper Mountain NWR is approximately 2,500 acres. It was acquired in 1974, well before the condor reintroduction program began. The mineral rights were retained by private owners.

The refuge itself represents only a minute percentage of the feeding habitat of the condor, and was selected as the reintroduction site with full knowledge of the possible impacts of the oil and gas activities. It was chosen to provide a secure mountainous location under Service control to serve as the actual site for reintroductions into the wild and hoped-for future nesting, and not intended as a significant element of the condors overall habitat. The condors utilize a much

Mr. Barry T. Hill 2

wider habitat base on surrounding National Forest System and other lands for feeding. The manager reports the oil facilities generally do not disturb the condors, who frequently perch on them.

We recommend that this reference be deleted, as it is a dramatic-sounding statement with little real-world relevance to the condor recovery program. If not, we believe that it needs considerable explanation as set forth above.

The enclosure provides specific comments from the U.S. Fish and Wildlife Service, Office of Budget, Office of Policy Analysis, and Office of the Solicitor. We hope our comments will assist you in preparing the final report.

Sincerely,

Acting Assistant Secretary for Fish and Wildlife and Parks

Enclosure

GAO's Comments

1. We provided opportunity for the Department of the Interior and the U.S. Fish and Wildlife Service officials to review a draft of this report. To protect against the possibility of early disclosure of the report, we did not provide the department copies of the draft report to retain, but did give agency officials ample opportunity to review and take notes on the draft. We allowed department and FWS officials to review a draft of the report in Washington, D.C.; Denver; Atlanta; and Portland without restriction as to the time, number of personnel, or note-taking.

2. See our response in Agency Comments and Our Evaluation section on page 44.

3. See our response in Agency Comments and Our Evaluation section on page 45.

GAO Contacts and Acknowledgments

GAO Contacts

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Acknowledgments

In addition to the names above, Mary Acosta, Paul Aussendorf, Robert Crystal, Sandra Davis, Jonathan Dent, Doreen Feldman, Chalane Lechuga, John Mingus, Mehrzad Nadji, and Cynthia Norris made key contributions to this report.

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