The number of biological studies requiring or using radiotelemetry has increased dramatically within the last 10 years. Unfortunately, the requirements for authorization of frequency assignments are confusing. Radio-frequency spectrum managers are becoming increasingly concerned about unlicensed operations and the violations of rules and regulations pertaining to radio communications. Telemetry users must operate within the prescribed regulations because interference occurring between authorized and unauthorized telemetry studies is costly in person-hours, destroys the integrity of planned programs, and can create personnel safety hazards.

This paper clarifies U.S. Government regulations for licensing long-range animal tracking studies (commonly referred to as wildlife telemetry). No new regulations are described, but frequency management authorities are defined and existing rules are interpreted. All wildlife telemetry studies do require a frequency authorization or license under existing regulations. There are no licensing exceptions due to the low-radiated transmitter power.

THE ORGANIZATION FOR RADIO-FREQUENCY MANAGEMENT

Radio-frequency management in the United States is based on the Communications Act of 1934. This legislation divided the frequency spectrum into 2 user categories, Federal and non-Federal governments. That portion of the spectrum designated for Federal Government use is controlled by the National Telecommunications and Information Administration (NTIA). The Federal Communications Commission (FCC) manages the non-Federal portion of the spectrum for use by state and local government agencies as well as the private sector. Segments of the frequency spectrum are shared by both Federal and non-Federal users and operations within these bands are mutually coordinated by the Interdepartment Radio Advisory Committee (IRAC). Each Federal government agency and the FCC is represented on the IRAC to address spectrum management issues. The IRAC, through NTIA, has authority to approve, disapprove, and cancel Federal radio-frequency assignments. In effect, IRAC is the licensing entity for Federal government users while the FCC licenses non-Federal users.

GENERAL FREQUENCY INFORMATION

Almost all wildlife telemetry is performed in the VHF portion of the spectrum between 30 and 300 megahertz (MHz). This specialized equipment is readily available from commercial suppliers. Users should be cautioned, however, that manufacturers often design radio equipment and advertise specifications that are completely contrary to established frequency management regulations. It remains the responsibility of the equipment buyers to understand fully the product information and to purchase only in accordance with their actual frequency authorization or license.

FREQUENCY ASSIGNMENTS FOR WILDLIFE TELEMETRY

The frequency spectrum is divided into allocations designated for specific types of radio service (e.g., radio navigation, broadcasting, amateur radio, etc.). The following 3 assignments apply directly to the use of wildlife telemetry:
Wildlife and Ocean Buoy Frequency Assignments

In 1975, the FCC established frequency bands for wildlife and ocean buoy tracking. Volume II, Part 5, Subpart C, Section 5.108 of the FCC Rules and Regulations defines 2 spectral bands and the technical standards for wildlife and ocean buoy tracking. These spectral bands, 40.66–40.70 and 216–220 MHz, are part of the shared spectrum available to both Federal and non-Federal programs. However, these bands must be considered as the primary operating spectrum available to non-Federal users with licenses obtained from the FCC.

It should be noted that all wildlife telemetry applications are considered a secondary radio service with no protection from radio interference caused by any other authorized service. Likewise, wildlife telemetry is not permitted when it causes interference to authorized radio services, nor does it have legal recourse when it is interfered with by legitimate, primary or equal secondary users. The 216–220 MHz band is also used for industrial telemetry and other communications that may limit the bandwidth available for wildlife telemetry. This potential interference may discourage some users; however, a 4-MHz bandwidth is available to allow room for finding an unused portion of the band in any given locality. Through demonstrated usage (licensed operations), frequency managers may be able to someday justify wildlife telemetry as a primary radio service.

Licenses for wildlife tracking issued under Section 5.108 must be justified initially and then renewed every 2 years. The first license will ordinarily be granted for a period of 1–1.5 years. Applications for new wildlife telemetry programs must be within the 40.66–40.70 or 216–220 MHz bands defined specifically in the regulations. Licensees in these bands are subject to the following restrictions:

a. Airborne wildlife telemetering in the 216–220 MHz will be authorized in only the 216.0–216.1 MHz portion of the band. (This is recognized as a serious limitation for bird telemetry.)

b. All transmitters shall be FCC type accepted or the equivalent as specified in Section 5.109 of the FCC Rules and Regulations. (To date, the FCC has not enforced this regulation.)

c. Classes of emission shall be limited to A0, A1, A2, F1, F2, F9. (These designators apply to the method of amplitude or frequency modulation.)

d. Occupied transmitter bandwidth shall not exceed 1 kHz.

e. Maximum carrier power shall not exceed 1 milliwort for airborne wildlife applications and 10 milliwatts for terrestrial wildlife applications.

Experimental Service (Research) Assignments

Before acknowledged in FCC regulations, non-Federal wildlife telemetry was conducted under experimental assignments. These assignments are still available under Part 5, Subpart E—"Experimental Service (Research)" for studies requiring frequency bands not specifically set aside for radiotelemetry. The need for specific frequencies must be fully justified by the applicant. Furthermore, transmitters used in these bands shall comply with the requirements set forth in Section 5.108 discussed above. Non-Federal applicants may not apply for frequencies in the Federal bands without prior Federal concurrence. Some wildlife telemetry programs have qualified for these experimental licenses, but because experimental service is subject to periodic review and readjustments, these frequencies should not be considered for long-term studies. Applicants for experimental authority must justify the need, be willing to submit detailed results of their research, and operate under a 2-year license.
Department of the Interior Frequency Assignments

Since the 1960's, the Department of the Interior has designated 12 discrete frequencies each having a tolerance of 0.005% in the 164 MHz band to be used for wildlife telemetry. These 12 frequencies are assigned by the Department of the Interior and must be reviewed and updated every 5 years. The assignments are authorized on a secondary use basis meaning the frequencies are shared with primary users who have priority. These frequencies are used by the U.S. Fish and Wildlife Service and to some extent by the National Park Service, but they are not available to non-Federal users.

APPLYING FOR RADIO-FREQUENCY AUTHORIZATIONS

One of 2 organizations administer licensing of radiotelemetry for wildlife. The FCC licenses private radio users including citizens, institutions and universities, and state and local governments. IRAC representatives authorize (license) Federal departments and agencies. Within United States jurisdiction, no radio transmission may be made without authority of either the FCC or the NTIA as applicable. Ownership of the transmitter determines which organization has jurisdiction. If privately owned or controlled, FCC will license. If owned or controlled by the Federal government, NTIA has jurisdiction. Non-Federal government entities may have use of specially allocated frequencies within the Federal portion of the radio spectrum only when used in conjunction with Federal agencies; for example, a cooperative research project funded and supervised by the Federal government and conducted by a university or other organization. Upon termination of the cooperative research project, the authorized use is terminated. Further use requires a renegotiated contract submitted through appropriate channels.

Federal Government Applicants

Federal Government Program Managers may apply for frequency assignments by filing standard request forms (within the U.S. Fish and Wildlife Service, Form DI-800, Request for Radio Frequency Assignment). Regional frequency managers are available to assist with the technical jargon and processing of the completed forms. All Federal agencies are required to obtain a radio frequency assignment before ordering radio equipment, including radiotelemetry transmitters.

U.S. Fish and Wildlife Service employees are required to contact the Radiocommunications Coordinator in their regional office for direction in how to make application for frequency assignments. The coordinator will assist in the preparation of Form DI-800 and necessary supporting documentation. Most other Federal agencies have established similar operating procedures for the handling and coordination of requests for radio-frequency assignment.

Non-Federal Government Applicants

Federal Communications Commission frequency applications for non-Federal programs are made on FCC Form 442 “Application For New Or Modified Radio Station Authorization Under Part 5 Of FCC Rules, Experimental Radio Services (Other Than Broadcast),” and, if required, FCC Form 440-A “Supplemental Information For Applications In The Experimental Radio Service Involving Government Contracts.” These forms are available through the nearest FCC field office. As with Federal applicants, the same general considerations are given to each request, and researchers should not order equipment until the frequency assignments are received.
Because few wildlife telemetry requests are processed in comparison to standard communications requests, the local FCC office may not be familiar with pertinent rules and regulations. For assistance in obtaining forms or answering questions, contact the FCC, Frequency Liaison Branch, 2025 M Street, Washington, D.C. 20554. State agencies are advised to apply for assignments through their own frequency-management coordinators.

SUMMARY

Federal and non-Federal wildlife telemetry studies are required by law to have valid frequency assignments. Information presented here should assist new telemetry users in obtaining licenses and encourage unlicensed operators to take the proper steps to comply with the regulations.

Acknowledgments.—I thank M. P. Terry, National Radio Communications Manager, U.S. Fish and Wildlife Service and the staff of the Frequency Liaison Branch of the FCC for their assistance with this paper.

MOVING RED-COCKADED WOODPECKER COLONIES: RELOCATION OR PHASED DESTRUCTION?

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In January 1976, we were asked to study possible solutions to a problem involving the presence of a red-cockaded woodpecker (Picoides borealis) colony at a site intended for construction of a large barracks complex at Fort Benning, Chattahoochee County, Georgia. In this paper we describe the results of efforts to shift the colony from the construction site by strapping sections of cavity trees with completed red-cockaded woodpecker cavities to mature pines approximately 400 m from the original site.

On 5 January 1976, we found 6 cavity trees, all longleaf pines (Pinus palustris), left standing in an area that had been otherwise cleared for construction the previous year (area A, Fig. 1). The cavity trees were about 200 m from the nearest stand of pines (P. palustris and P. taeda), which was composed of 20–30-year-old trees with a dense hardwood understory, generally considered poor habitat for the red-cockaded woodpecker. The nearest mature pines with a relatively open understory were 300 m northwest of the cavity trees. A seventh cavity tree was found 450 m to the northwest of the original 6 (area B, Fig. 1), and 450 m west of the seventh tree were 3 others (area C, Fig. 1). All trees showed signs of recent red-cockaded woodpecker activity (Jackson 1977, 1978) and our first objectives were to determine which trees were being used by red-cockaded woodpeckers and whether the birds were part of 1 or more colonies. That evening 3 red-cockaded woodpeckers roosted in cavi-