10 seconds, as it would be in a great earthquake, some of these buildings would have collapsed completely.

Four hospitals in the region were damaged so severely that they were inoperative just when they were most needed. Certain critical structures—hospitals, schools and other high-occupancy buildings—"should be designed so that they will remain functional even after experiencing the most severe ground shaking."

The near-failure of the Van Norman Dam endangered the lives of thousands. "Such risks are clearly unacceptable," the panel said. A program for bringing older dams in earthquake-prone areas up to the best safety standards is imperative, it said. Many deaths resulted from the collapse of old buildings. There are thousands of such buildings in California. These, the panel said, should be either rendered safe or razed.

Serious disruption of transportation and some deaths resulted from collapse of bridges and freeway overpasses. Code requirements for such structures are termed "grossly inadequate." Damage to the Sylmar Converter Station, a key link in a system for transmission of electric power into the Los Angeles area, will keep the system inoperable for about a year. For the crucial systems vital to millions of people—gas, electricity, water—design of individual components is not enough, in the panel's view; sufficient redundancy should be built into the system to ensure against complete failure during an earthquake.

On the other hand, the panel noted, school buildings in the region of strong shaking that were constructed according to earthquake-resistant building codes did not suffer enough structural damage to have endangered students if school had been in session. This seems to demonstrate that one- and two-story school buildings can be made safe by practicable code requirements.

Other recommendations are to improve emergency services, make rapid reconnaissance studies immediately following an earthquake, study damaged urban dwellings to improve building guidelines, develop better earthquake insurance for houses and small businesses, bring about better seismic zoning, study the San Andreas Fault to see how the recent quake changed it and, in general, to make more detailed seismological studies.

"It is now clear that better preparation could have been made," the panel concludes. It is certain that earthquakes of this size and larger will occur again. "What seems needed now is to learn from the San Fernando earthquake how best to prepare for and cope with the effects of future disasters of this kind." □

ENVIRONMENT UPPERMOST

NOAA charts a course

NOAA

Dr. White: Emphasis on environment.

Since passage of President Nixon's Reorganization Plan Four, which established the National Oceanic and Atmospheric Administration (SN: 10/3/71, p. 283), and appointment of Dr. Robert M. White as its first Administrator, no formal statements have emanated from the organization about its directions for the future. Last week, shortly after having been sworn in by the Secretary of Commerce, Dr. White outlined some of his plans for the new agency.

NOAA's prime target for the immediate future, Dr. White said, will be the environment. "It is no longer possible to relegate environmental concerns to the bottom of the pile; they must be on top." Although a separate agency—the Environmental Protection Agency—is specifically concerned with the environment, Dr. White sees the roles of the two agencies as complementary. The EPA is a regulatory, standard-setting agency; NOAA is concerned with basic research. "The environment just happens to be uppermost in our minds."

Specifically, NOAA will be concerned with determining atmospheric conditions that make for pollution, the effects of pollution on weather, and contaminants in fish. But it is not enough to know that certain ocean fish carry heavy metals in their systems, Dr. White said. "We must know how these contaminants enter and move through the marine ecosystem."

But the approach will apparently be broader than problems of pollution and environmental deterioration, covering all aspects of the relationship between man and his environment.

Industrial activity in the coastal waters is already in excess of $20 billion annually. The development and protection of ocean resources will be a major concern of NOAA. One new program will be for Marine Resources Monitoring Assessment and Prediction. MARMAP will survey the kinds and quantities of living marine resources—such as ichthyoplankton, groundfish and pelagic fish—available to the people of the United States and provide data for their domestic and international management. Surveys of inshore, continental shelf and deep ocean regions for navigation and resource development will be increased.

One high-priority item, Dr. White said, will be establishment of a national environmental monitoring, warning and prediction system. The rapid weather wire service will be expanded. A network of VHF-FM stations now broadcasts continuous weather information to local areas, and the Weather Services radar network is almost complete. The new Improved TIROS Operational Satellite, launched late last year, will be equipped with infrared sensors to provide information on temperature, water vapor and other atmospheric variables all over the globe. Satellites have proved useful in hurricane and severe local storm prediction. The major problem yet to be solved is to find more rapid means of communicating the information they transmit. "The average lifetime of a tornado, for example, is ten minutes," he points out. "With communication methods presently available to us, it is sometimes difficult to warn a significant segment of the populace before a tornado is gone."

In addition, NOAA plans to launch, with the National Aeronautics and Space Administration, one Geostationary Operational Environmental Satellite in 1972 and another in 1973. Since "the weather is a force which consistently causes tragic loss of life and billions of dollars in property damage every year," another area of emphasis will be weather modification, especially of hurricanes and other severe weather. "If we can one day exercise some degree of control over the weather, in addition to predicting it, the consequences to the American economy would be great indeed."

In fisheries research, many new laboratories are understaffed. Dr. White says he will take steps to correct this situation and to "get our fisheries research fleet into the water."

Though earth sciences are not contained in the agency's name, there will be efforts in that field, as well. February's earthquake in California for example, is being studied intensively.

Weather studies will be extended farther into the seas, with improved systems for prediction of tides and currents and ocean weather, including development of the National Data Buoy System. This, coupled with satellites, should provide information from hitherto unobserved areas. □