pumped-out oil tanker." Shepherd's committee did not advocate dumping as a standard practice, however. It pointed out that repeated scuttling of similar structures with a low impact could accumulate into a large overall impact.

The scientific analysis was commissioned by Britain's Department of Trade and Industry (DTI), which issues licenses for deep-sea dumping. In the wake of the Brent Spar spectacle, DTI asked Britain's Natural Environment Research Council to look into the risks of deep-sea disposal and compare them with other options. Shepherd assembled a group of scientists and engineers specializing in deep-ocean biology, oceanography, environmental toxicology, chemistry, geology, and engineering. The group's first report, based on analysis of the literature and computer modeling of the area, simply seeks to characterize the deep sea-floor environment and the impact of a structure such as the Brent Spar, without comparing such disposal to other methods. It will do that analysis when Shell declares what methods it is considering.

Shell welcomed the report last week, as it confirmed the company's studies that the environmental impact of dumping the Brent Spar would be small. But Greenpeace also gave it a warm reception. The panel's warning about the possible cumulative effects of repeated dumping, Greenpeace says, means the DTI's case-by-case approach to licensing such dumping is inadequate.

At a press conference last week, Shepherd said that more research is needed into the impact of "analogs" to such dumps, such as shipwrecks and waste sludge disposal, as well as natural processes, including slumps and hydrothermal vents. He also put great emphasis on the group's "attempt to reduce confusion and improve public understanding [of the issue]." Deep sea-floor biologist and group member Tony Rice of the Southampton Oceanography Centre says that the most useful outcome of the report would be more openness in the selection of sites and licensing of dumps—one of the report's main recommendations. Last year Shell kept many of its studies secret, and when they were made public scientists soon spotted flaws—most notably in the company's estimation of the ocean currents at the chosen site and its level of biodiversity. "Had the process been more open, some of these events might not have happened," Rice says.

In the meantime, Shell is still wondering what to do with the most famous oil-storage buoy in the world. Last October, it put out a request for proposals to deal with Brent Spar and has so far received 419, from members of the public as well as the oil industry. The company is trying to winnow the pile down to a short list of six for full project studies. Deep-sea disposal may be among them, but for the meantime the company is keeping details secret.

–Daniel Clery

RUSSIA

Academy Fights to Maintain Research in the "Wild East"

VLADIVOSTOK, RUSSIA—In July, 30 Russian, American, and Japanese scientists are scheduled to set sail from here on a Russian research vessel to study the biodiversity of a scientifically fascinating region: the Kuril Islands off Japan's northern tip. These islands, which were off-limits to foreigners for decades because of their strategic importance to the former Soviet Union, have a unique biological heritage, including species that have developed in isolation for up to 70 million years. This important expedition is the latest example of the trans-Pacific alliances that have been forged since Russia opened up its far eastern coast to the outside world. But it is also a symbol of a different kind. It is the only expedition the Far Eastern Branch (FEB) of the Russian Academy of Sciences can afford this year, and as *Science* went to press, it still faced an embarrassing hurdle: The academy was scrambling to pay a dock fee that would allow the ship—the *Professor Bogorov*—to leave harbor.

T. W. PIETSCH

Diverse bounty. Earlier expeditions to the Kuril Islands have identified nearly 60 new species of spiders, mollusks, and other organisms.

In the 1980s, the FEB led up to three dozen international expeditions a year on eight ocean-going vessels, while another seven ships operated close to shore. "We have the biggest and best ships for biology in the world," says Alexey Zhirmunsky, former director of Vladivostok's Institute of Marine Biology. But this once-proud fleet is now in dire straits. Several vessels are rusting away in disuse, while others are leased out for commercial ventures, such as transporting television sets from Japan, simply to keep their crews employed until better times arrive. As a result, dozens of scientific projects are floundering. "The FEB's overall research quality ... has decreased dramatically," says chemist Victor Vaskovsky of the Pacific Institute of Bio-Organic Chemistry (IBC) in Vladivostok.

Just a few years ago, Vladivostok looked set to become a research boomtown, not a ghost town. During the Soviet era, most of the region was closed to foreigners because of its numerous military bases—the Russian Navy's Pacific Fleet, for instance, is based in Vladivostok. But in 1990, the Soviet Union opened up the Far East, and scientists from Pacific Rim countries such as China, Japan, and Korea, as well as from Alaska and the U.S. Pacific Northwest, began streaming in to forge new ties. Best known for its biology and environmental sciences, the FEB hosted visits from nearly 700 foreign scientists in 1992. The influx fueled a rapid rise in joint expeditions on both land and sea, from 17 in 1992 to 64 in 1993.

But the boom quickly turned to bust. Thanks to dwindling support from the state—the FEB's $36 million budget for 1996 is just one-eighth the amount it spent in 1980—as well as high inflation, FEB scientists say it is nearly impossible now to host foreigners. IBC deputy director Valentin Stonik says his institute can no longer afford to pay visitors' expenses, nor can it run its ship, the *Academik Oparin*, which costs $7000 a day to operate. "Now it's very rare to have visits," he says.

This year's Kuril expedition has managed to stay afloat, so far, because it has substantial overseas support. The U.S. National Science Foundation's biotic surveys and inventories program has budgeted $75,000 for the expedition. The FEB will pay $35,000—a sum already in hand—for items such as fuel, food, and crew salaries. The Japan Society for the Promotion of Science will pay $20,000 for the expenses of six Japanese researchers, and the Japanese TV station NHK is currently negotiating a deal to pay up to $20,000 for fuel and an NHK documentary team.

The expedition is part of a 6-year, $1.2 million effort to map the biological diversity of this Russian chain of 56 islands that stretches from the southern tip of Russia's Kamchatka peninsula to the northeastern coast of Japan's Hokkaido island. The Soviet Union strictly limited access to the Kurils, where it kept military garrisons during the Cold War, all but excluding the islands from scientific study. But when they were opened up in the early 1990s, they yielded rich scientific harvests.

On the first two expeditions, scientists identified nearly 60 new species of spiders, mollusks, and other organisms. "We have

Trans-Pacific Alliance Draws Up Ecology Plan

VLADIVOSTOK AND KHABAROVSK, RUSSIA—Last month, a group of American, Chinese, and Russian environmental scientists finished a draft report* that lays out an unprecedented plan for balancing economic development with the preservation of key ecosystems in the biologically rich Ussuri-Wusuli river watershed that spans the border between China and Russia. The report, which designates areas for development, preservation and monitoring, and ecosystem restoration, is the fruit of a 2-year trilateral collaboration involving 150 scientists—the largest joint study since much of Russia's Far East was opened to foreigners in 1990 (see main text).

But whether this ambitious plan will win political support is far from certain. Since the collapse of the Communist government in 1991, politicians in the region have been encouraging any kind of new commercial enterprise. Logging is a major industrial activity on both sides of the border, while in China there is additional pressure from the Daqing oil field, coal mining, and agricultural programs aimed at stepping up production of wheat and corn. "An explosion of international trade and consumerism is transforming the landscape," says the report. "Our task was to find a balance between exploitation and preservation," says Boris Vorontov, acting director of the Institute of Aquatic and Ecological Problems (IAEP) in Khabarovsk. And next month's presidential election is adding more uncertainty. "No one can be sure what action the legislators will take," says Anatoly Kachur, deputy director of the Pacific Geographical Institute (PGI) in Vladivostok.

Threatened ecosystem. Ambitious proposal aims to protect the Ussuri-Wusuli watershed.

Concern over unchecked development in the region prompted action from two New York–based nonprofit organizations: Ecologically Sustainable Development (ESD) and the National Committee on U.S.–China Relations (NCUSCR). These two bodies teamed up to launch discussions with Chinese and Russian officials and scientists in 1993, but the talks began in an atmosphere of distrust because China and Russia are still wrangling over part of the border in the region.

The sides overcame their wariness and in May 1994 signed a trilateral agreement to begin preparation and drafting of the report. The NCUSCR raised $600,000 from private U.S. foundations, the Russians provided nearly $500,000 from a U.S. Agency for International Development grant, and the Chinese covered the costs of their scientists' travel. Much of the work was a review of existing ecological and industrial profiles, although team members often went into the field to verify data and visited the Lake Tahoe and Adirondack regions of the United States in August 1994 to get a view of sustainable development programs.

The report is intended as a road map for preserving a unique biological milieu in the 25-million-hectare watershed, two-thirds of which lies in southeastern Russia. It says the watershed is home to 25% of Russia's biodiversity, including all 250-odd members of the endangered Amur tiger population and the last 30 Amur leopards. The Chinese side is best known for its Sanjiang wetlands, breeding grounds for migratory birds such as the red-crowned crane, black stork, and Steller's eagle. "There's simply a huge diversity of life in this region," Vorontov says. The report recommends a range of land-use options, including strict preservation as nature reserves, limited use as recreation areas or for salvage logging, and commercial zones. The report offers dozens of "sustainable" investments, from chicken farms in Shuangyashan, China, to ginseng plantations in Russia's Vyazemskii region, and calls for two Russian-Chinese panels to oversee its recommendations.

Not everyone is ready to embrace sustainable development, however. "Many in the business community oppose our plan," says Vorontov. However, Russian scientists have met several times in the past 2 years with members of the two regional parliaments to try to convince politicians the report does not aim to thwart commercial development. Legislators in Khabarovsk have drafted a bill that would implement many of the report's recommendations, says Antonia Bullard, ESD's vice president for economic development. The scientists say they will continue to press their case before the report is published in final form this fall. "Generally, [the legislators] are on our side," Vorontov claims.

–R.S.

* "A sustainable land use and allocation program for the Ussuri-Wusuli river watershed and central Sikhote-Alin range of northeastern China and the Russian Far East," ESD, Heilongjiang Province Territory Society, NCUSCR, IAEP, PGI, April 1996.

almost no information about invertebrates and other organisms on a number of the islands," says Victor Bogatov, head of FEB's scientific research department and Russian coordinator of the expedition. Adding urgency to the mission is the islands' tenuous political situation. Japan and Russia are still negotiating the fate of the four southernmost islands, which Russia has occupied since the end of World War II but which Japan claims as its territory.

But in spite of its secure budget, one unforeseen problem still threatens this summer's trip. To put money in voters' pockets and hence boost his popularity before next month's elections, President Boris Yeltsin ordered the Russian Academy of Sciences in January to use its state budget only for salaries, prohibiting institutes from spending money on operational expenses. However, the FEB must pay the Vladivostok Port Authority a dock fee, which varies by ship size, every 5 years for each ship. The $70,000 fee for the *Professor Bogorov* is due this month. If the FEB cannot pay, says Bogatov, "they won't let the ship leave the harbor." In the coming months, dock fees will come due for two other ships, including FEB's flagship, *Academik Nesmeyanov*.

Because of the expected number of researchers on this summer's expedition, FEB officials say they cannot simply swap the *Professor Bogorov* for another vessel. That leaves Bogatov frantically trying to persuade government officials in Moscow to grant the FEB an exception to Yeltsin's order and allow it to pay the dock fee from salary funds.

But Bogatov is running out of time: After paying the fee, he says it will take 2 to 3 weeks to carry out routine repairs to make the *Professor Bogorov* seaworthy. In addition, Bogatov says he needs several weeks prior to the trip to procure fuel and provisions. "This situation cannot last much longer," he says. If it does, and the Kuril expedition is canceled, FEB's research fleet could be left with an empty logbook for 1996—a sad symbol of the parlous financial state of Russia's scientific enterprise.

–Richard Stone