

Morishita argues that humpback and fin whales are now competing with the minke for krill and says their new program will test this idea.

Some researchers agree that the Japanese data are important. "They are doing valid science," says Norway's Walløe, pointing in particular to Japanese genetic data that suggest the minke whale numbers in the Southern Ocean are declining, and that minke there are growing slimmer, losing blubber. "Whether or not it is necessary for their study to take so many hundreds of whales every year for science, I cannot comment." Walløe adds that the Japanese also provide biopsy samples, which are rare from large baleen whales in the Southern Ocean.

But these data can be gathered without killing the whale, say Herman and others. "The Japanese want to ask which breeding populations the whales belong to, if these are growing, and where do they feed," says Gales. "These are all questions which can be answered using nonlethal techniques including observation, satellite tracking, and genetic studies." He and many others are unconvinced by the idea of food competition and say that it betrays an overly simplistic view of complex marine ecosystems.

Researchers on all sides agree that the humpback whales' numbers in the Southern Ocean are increasing. Indeed, the data should "make everyone happy," says Morishita. "Their numbers are so large now that their increase seems to be adversely affecting the minke whale. We want to see if that is the case."



Taken. Japanese ships catch minke whales like this one, as well as a few other species, under scientific programs.

But Clapham says not all southern humpback populations are rebounding. Whales from a variety of breeding populations congregate in the feeding area of the Southern Ocean. Most are part of two fairly large populations (totaling nearly 20,000) that travel from Antarctica to Australia's coasts, where they mate and birth their calves. Others, however, hail from far smaller populations that breed in the waters off Fiji, New Caledonia, and Tonga. "These stocks were devastated by illegal Soviet whaling in the late 1950s and '60s," says Clapham. "They've never recovered and still number in the mere hundreds or fewer. But they feed in Antarctica with the whales from Australia. It's impossible to tell them apart; they don't have signs on their backs. How are the Japanese going to be sure they don't take humpbacks from these highly endangered populations?"

Japan's program suggests to OSU's Baker that the science is largely about managing whales for future harvest. Whaling "can be done sustainably, which is why Japan collects the kind of data it does," says Walløe. "If whales are going to be hunted in

a sustainable manner, then we need this kind of information. But, if we're not going to kill any whales, then it could be argued we don't need it." And the killing of whales, he notes, has now become more of a political than a scientific question.

Because the scientific whaling program is "out of control," says former U.S. Whaling Commissioner Rollie Schmitt, it might be better to just phase it out

and permit tightly controlled commercial whaling, while prohibiting any international trade in whale meat. IWC has attempted to negotiate similar agreements at its annual meetings since 1996—but it has always failed, partly because some countries, notably Australia, New Zealand, and the United Kingdom, refuse to consider removing the ban. Meanwhile, subsistence hunts by aboriginal peoples in the United States, Russia, Greenland, and the Caribbean nation of St. Vincent and the Grenadines are also up for renewal this year. All this sets the stage for a contentious meeting when the full IWC gathers at the end of May.

As a small island nation, Japan defends its right to marine resources. Japanese generally perceive antiwhaling sentiment as anti-Japanese, says Funahashi. But she holds out hope for change. "Most Japanese don't know that we hunt whales in Antarctica," she says. "They think it's only in Japanese waters. When they hear about this other, they don't approve. Now more Japanese are going whale watching, and this is changing people's attitudes." It's harder, after all, to eat an animal you know.

—VIRGINIA MORELL

CROSS-CULTURAL RESEARCH

Pentagon Asks Academics for Help In Understanding Its Enemies

A new program at the U.S. Department of Defense would support research on how local populations behave in a war zone

The Iraq War was going badly in Diyala, a northern province bordering Iran, in late 2005. A rash of kidnappings and roadside explosions was threatening to give insurgents the upper hand. Looking for insights on how to quell the violence, the U.S. Department of Defense invited a handful of researchers funded by the agency to build computer models of the situation combining

recent activity with cultural, political, and economic data about the region collected by DOD-funded anthropologists.

The output from one model, developed by sociologist Kathleen Carley and her colleagues at Carnegie Mellon University in Pittsburgh, Pennsylvania, connected a series of seemingly disparate incidents to local mosques. Results from another model, built

by computer scientist Alexander Levis and his colleagues at George Mason University (GMU) in Fairfax, Virginia, offered a better strategy for controlling the insurgency: Getting Iraqis to take over the security of two major highways, and turning a blind eye to the smuggling of goods along those routes, the model found, would be more effective than deploying additional troops. The model also suggested that a planned information campaign in the province was unlikely to produce results within an acceptable period of time.

Researchers and DOD officials say these insights, however limited, demonstrate a role for the social and behavioral sciences in combat zones. And a new program called Human Social Culture Behavior Modeling will greatly expand that role. John Young Jr., director of Defense Research and Engineering and

architect of the program, has asked Congress for \$7 million for fiscal year 2008, which begins on 1 October, as a down payment on a 6-year, \$70 million effort. Agency officials expect to direct an additional \$54 million in existing funds to social science modeling over the next 6 years. Under the new program, the agency will solicit proposals from the research community on broad topic areas announced periodically, and grants will be awarded after an open competition.

Officials hope that the knowledge gained from such research will help U.S. forces fight what the Bush Administration calls a global war on terror and help commanders cope with an incendiary mix of poverty, civil and religious enmity, and public opposition to the U.S.-led occupation of Iraq. "We want to avoid situations where nation states have unstable governments and instability within populations, with disenfranchised groups creating violence on unsuspecting citizens," says Young. "Toward that goal, we need computational tools to understand to the fullest extent possible the society we are dealing with, the political forces within that government, the social and cultural and religious influences on that population, and how that population is likely to react to stimuli—from aid programs to the presence of U.S. troops."

The approach represents a broader and more scientific way to achieve military objectives than by using force alone, according to Young. "The military is used to thinking about bombs, aircraft, and guns," he says. "This is about creating a population environment where people feel that they have a voice and opportunity." Such tools would not replace the war games that military commanders currently use to simulate combat between conventional defense forces. Instead, the models would give military leaders knowledge about other options, such as whether improving economic opportunity in a disturbed region is more likely to restore order than imposing martial law and hunting down insurgents. Once developed in academic labs, the software would be installed in command and control systems.

The plan has drawn mixed reactions from defense experts. "They are smoking something they shouldn't be," says Paul Van Riper, a retired lieutenant general who served as director of intelligence for the U.S. Army in the mid-1990s. Human systems are far too complex to be modeled, he says: "Only those who don't know how the real world works will be suckers for this stuff."

But retired general Anthony Zinni, former chief of U.S. Central Command and a vocal critic of the Administration's handling of the

Iraq War, sees value in the program. "Even if these models turn out to be basic," he says, "they would at least open up a way for commanders to think about cultural and behavioral factors when they make decisions—for example, the fact that a population's reaction to something may not be what one might expect based on the Western brand of logic."

The new program is not the first time the military has tried to integrate cultural, behavioral, and economic aspects of an adversary into its battle plans. During the Cold War, for example, U.S. defense and intelligence agencies hired dozens of anthropologists to prepare dossiers on Soviet society. Similar efforts were made during the U.S. war in Vietnam,

rule as well as come up with other, more useful ones. Last year, the researchers applied their tools to provide the U.S. Army with a detailed catalog of violence committed against the United States and each other by tribes in the Pakistan-Afghanistan region.

Other modeling projects are addressing more fundamental questions. With funding from the Air Force Office of Scientific Research, mathematical economist Scott Page of the University of Michigan, Ann Arbor, and his colleagues are modeling societal change under the competing influences of an individual's desire to act according to his or her values and the pressure to conform to social norms. The work could shed light on which

Beyond bombs and guns. DOD officials say social science models can supplement the use of force to reduce violence in Iraq.



with little success. But proponents say that today's researchers have a much greater ability to gather relevant data and analyze the information using algorithms capable of detecting hidden patterns.

A few such projects are already under way. At the University of Maryland, College Park, computer scientist V. S. Subrahmanian and his colleagues have developed software tools to extract specific information about violent incidents from a plethora of news sources. They then use that information to tease out rules about the enemy's behavior. For example, an analysis of strikes carried out by Hezbollah, the terrorist group in Lebanon, showed that the group was much more likely to carry out suicide bombings during times when it was not actively engaged in education and propaganda. The insight could potentially help security forces predict and counter suicide attacks. "This is a very coarse finding, not the last word by any means," cautions Subrahmanian, adding that a lot more data and analysis would be needed to refine that

environments are most supportive of terrorist cells, information that could help decide where to focus intelligence-gathering efforts and how to bust those cells. The research could also help estimate, by looking at factors such as rise in unemployment and growing social acceptance of violent behavior, when a population may be plunging into chaos. That in turn could help commanders and policymakers decide when and how to intervene.

Accomplishing those goals is a tall order, Page admits. "Despite tons and tons of data from U.S. elections," he says, "we are still not very good at predicting how people will vote."

Building comprehensive and realistic models of societies is a challenge that will require enormous amounts of empirical data, says GMU's Levis, a former chief scientist of the U.S. Air Force. But it is doable, he says, adding that the field will benefit greatly from linking social science researchers and computer scientists. "The goal here is to win popular support in the conflict zone," he says.

—YUDHIJIT BHATTACHARJEE