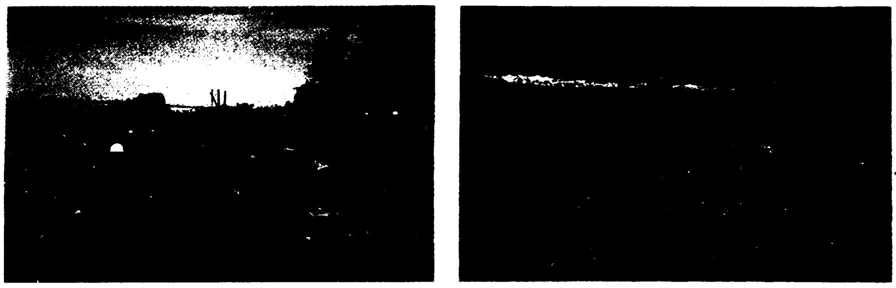

Courtesy of Exxon USA

Smith Island beach oiled by the Exxon Valdez *spill. The first photo was shot May 2, 1989, while cleanup was under way; the second, June 6, 1992.*

ment scoured blackened rocks bright again. Displaying before-and-after shots of one Smith Island beach he visited (see photos), Robbins said, "I swear, I never expected it to come clean like that."

The frequently used high-pressure, hot-water washing also "annihilates a lot of marine life that otherwise survive the spill," observes Alan J. Mearns of NOAA's ecological recovery monitoring program in Seattle. Rockweed, a brown alga, proved its most prominent victim. Formerly constituting up to 90 percent of the intertidal plant mass in some areas of Prince William Sound, it virtually disappeared in many areas subjected to hot water, scientists reported. And especially in higher tidal zones, rockweed's recovery remains slow.

But it was oil that devastated the bird population. Oil killed perhaps half a million – more than 10 times as many as in any other U.S. spill, says D. Michael Fry of the University of California, Davis. Notable casualties included perhaps 11 percent of the 8,000 bald eagles in Prince William Sound. However, say scientists with the U.S. Fish and Wildlife Service, that population may already have recovered.

The same has not proved true of harlequin ducks. Fry said half of those living in the oiled regions were killed outright, and most that survived have failed to breed. Dennis Heinemann of Walcott and Associates in Alexandria, Va., reported that up to one-third of the area's adult common murres – diving seabirds that resemble mini-penguins – died directly from the spill. Even more troubling, he noted, breeding in colonies affected by the oil has virtually ceased.

Other researchers described signs of "functional sterility" in pink salmon and herring from heavily oiled areas. While these fish continue to spawn, certain age classes have produced dramatically increased numbers of dead eggs or severely malformed hatchlings – such as live young with curved spines or no jaws.

A pilot study by Evelyn D. Biggs of Alaska's Department of Fish and Game in Cordova, for example, suggests that year-old herring who lived in oiled near-shore waters in 1989 produced just half the viable young last year of similar herring from unoiled waters. So dramatic an effect this long after a spill "has never been documented before," she says and might indicate damage to cells producing sperm and eggs. If true, says Biggs, these fish would be "reproductively impaired for the rest of their lives."

Organizers of last week's meeting had invited Exxon to present research – and to share in planning the symposium. The company chose instead to unveil its data in April at an American Society for Testing and Materials (ASTM) meeting in Atlanta. ASTM offers a more "independent" forum, says Dennis Stanczuk of Exxon in Anchorage. Moreover, he contends, the Anchorage meeting's "stated purpose was to help make decisions on how [damage] settlement funds will be allocated." As Exxon is not part of that process, he says, "it would be inappropriate to take part."

L.J. Evans of Alaska's Department of Environmental Conservation in Anchorage disagrees. An organizer of last week's meeting, she says the symposium was never intended to affect spending of the $900 million settlement.

Exxon has invited trustee-funded researchers to report at ASTM, however, "and we will," Wright says. *– J. Raloff*

Plants relay signals much as animals do

Scientists first noticed ethylene's effects on plants at the turn of the century, when they realized that this gas, leaking from street lamps, caused trees to drop their leaves. They later discovered that ethylene is a plant hormone that can dramatically alter the shape of seedlings grown in the dark. By studying these odd seedlings, molecular geneticists have now uncovered hard-to-obtain details about how plant hormones work.

Kieber et al./Univ. Pennsylvania

Short, curved seedling (middle) grows as if exposed to ethylene.

Ethylene sets off a chemical cascade inside plant cells that alters genetic activity, says Joseph J. Kieber of the University of Pennsylvania in Philadelphia.

He and his colleagues describe one chemical in this cascade – a protein kinase enzyme – in the Feb. 12 CELL. Remarkably, the enzyme's gene resembles genes for similar enzymes in animals.

"It's a real breakthrough," comments Elliot M. Meyerowitz, a molecular geneticist at the California Institute of Technology in Pasadena. "It's the first molecular identification of an intermediate [chemical] in a plant hormone signal transduction pathway."

Scientists seek to understand ethylene because it helps plants alter their growth and development in response to the environment. Emerging seedlings make ethylene so they can break through hard soil. Later in the plant's life, the rapid production of this substance may protect a torn leaf from infection. Finally, ethylene affects the rate at which fruit ripens or petals fade.

Since many companies seek to control fruit ripening or floral blooming, this report "is tremendously interesting from a practical and basic perspective," says Harry Klee, a plant molecular biologist at Monsanto Co. in St. Louis. Also, clues about ethylene may help clarify how nitric oxide, a simple gas and important messenger in animals (SN: 7/4/92, p.10), works, he adds.

To learn about ethylene, the Pennsylvania group screened more than a million *Arabidopsis* seedlings, culling out short ones with curled-up tips. These had grown as if they had been exposed to too much ethylene. The researchers added ethylene inhibitors to the short seedlings and discarded the ones that then began to grow normally: They represented plants that simply overproduced ethylene. The remaining seedlings represented plants with mutations in the signal pathway.

One mutation turns out to be in a gene that codes for a protein kinase, an enzyme that adds a phosphate to a protein, which then becomes the next signal in this chemical cascade. Without this protein-phosphate complex, cells act as if they were constantly being stimulated by ethylene, so the plant becomes stunted, says Joseph R. Ecker of the University of Pennsylvania.

"[This gene] turns out to be semifamiliar," says Meyerowitz. Yeast, worms, and fruit flies, as well as people, use similar protein kinases to relay chemical messages within cells. "It implies a commonality between plants and animals," he adds. *– E. Pennisi*