

Environmental Problems Disrupting Natural Cycles by Humans

1. radioactive contamination
2. pollution of the ocean
3. depletion of fish stocks
4. use of fossil fuels
5. draining of underground aquifers
6. clearing of forests
7. use of fertilizers and pesticides

When Nuclear Energy Goes Wrong...



Representing the people and organisations of the global nuclear profession

Nuclear Basics

Information Library

The WNA

Home › Information Library › Safety and Security › Safety of Plants

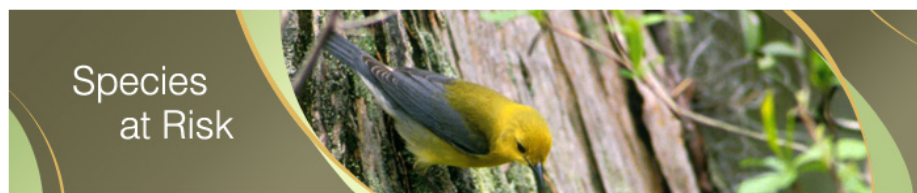
Safety of Nuclear Power Reactors | Chernobyl Accident | Fukushima Accident 2011 | Three Mile Island accident | Tokaimura Ci and Earthquakes | Liability for Nuclear Damage

Fukushima Accident 2011

(updated 2 April 2013)

- Following a major earthquake, a 15-metre tsunami disabled the power supply and cooling of three Fukushima Daiichi reactors, causing a nuclear accident on 11 March 2011.
- All three cores largely melted in the first three days.
- The accident was rated 7 on the INES scale, due to high radioactive releases in the first few days. Four reactors are written off - 2719 MWe net.
- After two weeks the three reactors (units 1-3) were stable with water addition but no proper heat sink for removal of decay heat from fuel. By July they were being cooled with recycled water from the new treatment plant. Reactor temperatures had fallen to below 80°C at the end of October, and official 'cold shutdown condition' was announced in mid December.
- Apart from cooling, the basic ongoing task was to prevent release of radioactive materials, particularly in contaminated water leaked from the three units.
- There have been no deaths or cases of radiation sickness from the nuclear accident, but over 100,000 people had to be evacuated from their homes to ensure this. Government nervousness delays their return.





How are Species listed "at risk"?

Definitions are:

Extinct - a species formerly indigenous to Canada that no longer exists anywhere.

Extirpated - a species no longer existing in the wild in Canada but occurring elsewhere in the world.

Endangered - a species threatened with imminent extinction or extirpation throughout all or a significant portion of its Canadian range.

Threatened - a species likely to become endangered in Canada if the factors affecting its vulnerability are not reversed.

Vulnerable - a species particularly at risk because of low or declining numbers, small range or for some other reason, but not a threatened species.

Canada's Endangered Species

256 Canadian species are listed by the Scientific Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as being extinct, extirpated, endangered, threatened and vulnerable. The list only includes Canada's vertebrate and vascular plant species and was released in April 1994.

Extinct - 9 species

Mammals, 2; Birds, 3; Fish, 4

Dawson's Caribou, Sea Mink, Great Auk, Labrador Duck, Passenger Pigeon, Deepwater Cisco, Longjaw Cisco, Banff Longnose Dace, Blue Walleye

Extirpated - 11 species

Mammals, 5; Birds, 1; Reptiles, 1; Fish, 2; Plants, 2

Grizzly Bear (Prairie population), Black-footed Ferret, Swift Fox, Walrus (Northwest Atlantic population), Gray Whale (Atlantic population), Greater Prairie-Chicken, Pygmy Short-horned Lizard, Gravel Chub, Paddlefish, Blue-eyed Mary, Illinois Tick Trefoil

Endangered - 55 species

Mammals, 11; Birds, 14; Amphibians, 1; Reptiles, 3; Fish, 3; Plants, 23

Mammals: Peary Caribou (Banks Island and High Arctic population), Eastern Cougar, Vancouver Island Marmot, Sea Otter, Bowhead Whale, Right Whale, Beluga Whale (St. Lawrence River, Ungava Bay and Southeast Baffin Island-Cumberland Sound populations), Wolverine (Eastern population).

Birds: Whooping Crane, Eskimo Curlew, Northern Bobwhite, Harlequin Duck (Eastern population), Anatum Peregrine Falcon, Acadian Flycatcher, Spotted Owl, Mountain Plover, Piping Plover, King Rail, Loggerhead Shrike (Eastern population), Henslow's Sparrow, Sage Thrasher, Kirtland's Warbler.

Amphibians: Blanchard's Cricket Frog.

Reptiles: Blue Racer Snake, Lake Erie Water Snake, Leatherback Turtle.

Fish: Salish Sucker, Aurora Trout, Acadian Whitefish.

Plants: Gattinger's Agalinis, Skinner's Agalinis, Eastern Prickly Pear Cactus, Slender Bush Clover, Pink Coreopsis, Southern Maidenhair Fern, White Prairie Gentian, Small White Lady's slipper, Furbish's Lousewort, Pink Milwort, Eastern Mountain Avens, Hoary Mountain-mint, Slender Mouse-ear-cress, Western Fringed Prairie Orchid, Heart-leaved Plantain, Large Whorled Pogonia, Small Whorled Pogonia, Wood Poppy, Engelmann's Quillwort, Threat-leaved Sundew, Cucumber Tree, Water-pennywort, Spotted Wintergreen.

Threatened - 62 species

Mammals, 8; Birds, 9; Reptiles, 3; Fish, 12;

Plants, 30;

Mammals: Wood Bison, Peary Caribou (Low Arctic pop.), Woodland Caribou (Quebec pop.), Newfoundland Pine Marten, Harbour Porpoise (Western Atlantic pop.), Pacific Water Shrew, Humpback Whale (North Pacific pop.), Behuga Whale (Eastern Hudson Bay pop.)

Birds: Yellow-breasted Chat (Okanagan pop.), Ferruginous Hawk, Marbled Murrelet, Burrowing Owl, Loggerhead Shrike (Prairie pop.), Baird's Sparrow, Roseate Tern, Hooded Warbler, White-headed Woodpecker

Reptiles: Eastern Massasauga Rattlesnake, Blanding's Turtle (Nova Scotia pop.), Spiny Softshell Turtle

Fish: Blackfin Cisco, Shortjaw Cisco, Shortnose Cisco, Channel Darter, Eastern Sand Darter, Margined Madtom, Black Redhorse, Copper Redhorse, Great Lakes Deepwater Sculpin, Shorthead Sculpin, Enos Lake Sickleback, Lake Simcoe Whitefish

Plants: Blue Ash, Anticosti Aster, Bluehearts, American Chestnut, Colicroot, Deerberry, Mosquito Fern, Western Blue Flag, Plymouth Gentian, Ginseng, Golden Crest, Golden Seal, Round-leaved Greenbrier, Giant Helleborine, van Brunt's Jacob's Ladder, Small-flowered Lipocarpha, Red Mulberry, Sweet Pepperbush, Nodding Pogonia, Redroot, Western Spiderwort, Pitcher's Thistle, Athabasca Thrift, Kentucky Coffee Tree, Purple Twayblade, Sand Verbena, Bird's-foot Violet, American Water-willow, Tyrrell's Willow, Blunt-lobed Woodsia

Vulnerable - 119 species

Mammals, 22; Birds, 23; Amphibians, 3; Reptiles, 4; Fish, 38, Plants, 29;

including Grizzly Bear, Polar Bear, Woodland Caribou (Western population), Grey Fox, Blue Whale (Atlantic and Pacific populations), Wolverine, Eastern Bluebird, Peales Peregrine Falcon, Tundra Peregrine Falcon, Cooper's Hawk, Ancient Murrelet, Great Gray Owl, Trumpeter Swan, Eastern Yellow-bellied Racer Snake, Spotted Gar, Pacific Sardine, Green Sturgeon, Redbreasted Sunfish, Victorin's Water Hemlock, Wild Hyacinth, Phantom Orchid, Prairie Rose, Hop Tree

Want to help? Join or Make a Donation to an Organization that makes a difference

- [The Alberta Wilderness Association, Calgary, Alberta](#)
- [Canadian Parks & Wilderness Society](#)
- [The Federation of Alberta Naturalists](#)
- [World Wildlife Fund - Canada](#)
- [Canadian Nature Federation](#)
- [Canadian Wildlife Federation](#)



Saving Species One at a Time

- Captive-breeding programs
 - Hope of reintroducing such species back into the wild
 - Ex. condors
 - Preserving genetic material
 - Germ plasm is any form of genetic material
 - Used for future use in research and species-recovery efforts
 - Zoos, aquariums, parks and gardens
 - Typically, a last resort for a species' survival
- More study needed

Preserving Habitats and Ecosystems

- The most effective way to save a species
- More species can be targeted in conservation efforts
- Focus on hotspots and those areas that are linked to larger networks

Legal Protection for Species

- Such laws protecting species are recent
- Endangered Species Act
- Habitat conservation plans attempts to target certain species across large areas of land through trade-offs and cooperative agreements
- International agreements happen through the IUCN (International Union for the Conservation of Nature)
 - Red lists
 - CITES (Convention on the International Trade in Endangered Species)
 - The Biodiversity Treaty from the Earth Summit

POSSIBLE ECO-ACTIVITY...30 Points

Upsetting the Nutrient Balance in an Ecosystem

Green Text - Page 47

Problem: How will lawn fertilizer affect the balance in an ecosystem?

Materials:

2 - beakers with a 1 L capacity

2L - pond water

6 - strands of *Cabomba*, *Elodea* or other aquatic plant (10-20 cm long)

6 - pond snails

Procedure:

1. Fill both jars with pond water.
2. Add half of the aquatic plants to each jar.
3. Add three pond snails to each jar.
4. Label one jar "Control" and the other "Experimental".
5. Add a **very small pinch** of lawn fertilizer to the "Experimental" jar.
6. Place the jars side by side in a bright location.
7. Observe the jars every day for 2-3 weeks. Make notes on any changes in the appearance of the aquatic plants and snails.

HW: Read back over your notes...

Unit Test planned for Wednesday!!!